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# REPORT

TO THE

# Mayor and Aldermen of the City of Chicago

BY THE

# CHICAGO HARBOR COMMISSION

---

CHICAGO
MARCH, 1909

RH MAR 1 6 1912

gift of Chicago City Statistician

c.52

# Chicago Harbor Commission

JOHN M. EWEN, Chairman

CHARLES H. CONOVER — ISHAM RANDOLPH

FREDERIC A. DELANO — CHARLES H. WACKER

ALDERMAN CHARLES M. FOELL — ALDERMAN PETER L. HOFFMAN

ALDERMAN JOHN P. STEWART

C. E. MERRIAM, Secretary

**Associated with the Commission as Expert Investigators**

J. PAUL GOODE

GEORGE C. SIKES

GEORGE G. TUNELL

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Chi 1910

Chicago - Water - F
Water fronts
Parks

20

Press of H. G. Adair
160-164 Lake St.
Chicago

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# Letter of Transmittal

Chicago, March, 1909.

*To the Mayor and Aldermen of the City of Chicago*
*in City Council Assembled:*

GENTLEMEN:

The Chicago Harbor Commission, created by resolution of the City Council and appointed by the Mayor, begs to submit herewith the final report of the Commission.

Respectfully,

JOHN M. EWEN, *Chairman.*
FREDERIC A. DELANO.
JOHN P. STEWART.
CHARLES H. CONOVER.
CHARLES M. FOELL.
ISHAM RANDOLPH.
PETER L. HOFFMAN.
CHARLES H. WACKER.

# PART I.

## Introductory Statement Regarding the Creation of the Harbor Commission, its Purposes and the Methods Employed.

The Harbor Commission created primarily to consider the question as to whether any part of the Chicago lake front should be reserved for possible future harbor uses, was not limited to the consideration of that one question. The resolution creating it called for a comprehensive study and detailed report on Chicago's harbors and their relation to railway terminal and park plans. Even with instructions narrower in scope, the Commission would have deemed such study essential to the determination of the specific question.

In 1903 and 1907 the General Assembly of Illinois enacted laws authorizing the Board of South Park Commissioners to take possession for park purposes of that portion of the lake front lying between Grant Park and Jackson Park. Under these laws that Commission was proceeding to acquire by agreement the riparian rights of land owners, chief among them the Illinois Central Railroad Company.

These riparian rights secured, the Park Commission planned the development of park areas and lagoons.

Apparently the only thing needed to complete the dedication for park purposes, to the exclusion of navigation uses, was the consent of the War Department.

January 6, 1908, Mayor Busse sent to the city council a special message calling attention to the legislation referred to and the plans of the South Park Commissioners. In this message the mayor indicated that nearly all of Chicago's lake front was already dedicated to park purposes, to the exclusion of navigation which may require harbor accommodations in portions of the lake front in the development of the city as a port. Accompanying the message was a copy of a letter from the mayor to the Secretary of

War asking a hearing before permission to complete the park plan should be granted.

The message included a request for the creation of a harbor commission.

The city council at once adopted resolutions authorizing the mayor to appoint a commission of five, and appropriating $5,000 to defray its expenses.

At the succeeding meeting of the city Council, January 13th, the mayor asked and was granted authority to name two additional members of the commission, in order to give the city council representation.

Mayor Busse thereupon appointed the commission:

CHARLES H. CONOVER,
FREDERIC A. DELANO,
JOHN M. EWEN,
ALDERMAN CHARLES M. FOELL,
ALDERMAN PETER L. HOFFMAN,
ISHAM RANDOLPH,
CHARLES H. WACKER.

May 4, 1908, Mayor Busse was authorized to appoint the chairman of the Council Committee on Harbors, Wharves and Bridges as a member of the Commission and named Alderman John P. Stewart.

The members of the Harbor Commission met in the office of the mayor January 17th, and organized by electing Mr. John M. Ewen chairman.

Headquarters of the Commission were established in the office of Mr. Ewen, 740 The Rookery.

At a meeting of the Commission held January 28, 1908, Professor C. E. Merriam of the University of Chicago was made secretary.

Public hearings were held and addresses made by the United States Engineer, representing the War Department, in Chicago; representatives of the coal, grain, lumber and other shipping interests, spokesmen for the boat lines, and speakers having special knowledge of or interest in water shipping. Stenographic reports were made of the addresses. A digest of the hearings is presented as an appendix to this report. A conference between the Harbor Commission, representatives of the South Park Board and

of the Commercial Club, considered the relation of harbor development to plans for beautifying the lake front.

Experts, appointed by the Commission, made special investigations. In April, 1908, Mr. J. Paul Goode, Professor of Economic Geography in the University of Chicago, was engaged to make a study and report upon modern harbor developments and the commercial and industrial benefits derived therefrom. He visited the principal ports of Europe, as well as Boston, New York and Philadelphia.

At the same time Mr. George C. Sikes was engaged for special investigation and to assist in the performance of secretarial duties. Mr. Sikes spent several months of the summer of 1907 investigating harbor conditions in New York City for the Bureau of Municipal Research. Before that he served as secretary of the Chicago Street Railway Commission and its successor, the Council Committee on Local Transportation.

Mr. George G. Tunell was retained to report on certain aspects of Chicago's harbor and railway terminal problem. Mr. Tunell, in 1897, made a report on lake traffic for the Treasury Department. He was secretary of the Special Council Committee on River Improvement named by Mayor Harrison in 1899 and acted for a time as secretary of the River Improvement Association, an organization later merged with the Association of Commerce. In addition he had ten years' experience in special research work in connection with two Chicago trunk lines.

The special reports of Mr. Goode, Mr. Sikes and Mr. Tunell are printed as Part IV of this report.

Other investigators employed to make historical and statistical studies were Mr. Judson F. Lee, Mr. Clark C. Steinbeck and Mr. L. C. McNemer. Much of the information thus gained appears in the appendices.

Valuable maps have been accumulated. When the Commission dissolves these will be turned over to the City Bureau of Statistics and Municipal Library, unless your Honorable Body directs some other disposition. The same course will be taken with regard to the records and documents in the possession of the Commission in order that they may be preserved for future reference. If a harbor department shall be established by the city council, as rec-

ommended by the Commission, this material would naturally be placed in its custody.

During the summer trips of inspection were made by the Commission. The main river, its north and south branches and the Sanitary District Canal were traversed by launch. The lake front was inspected from a tug and the harbors of South Chicago, Indiana Harbor and Gary visited. Trips were also made on the Calumet River and to Calumet Lake. A majority of the Commission made a trip of inspection to Duluth. Professor Merriam and Mr. Sikes went to Milwaukee and Buffalo, and Mr. Sikes, in addition, visited Cleveland and Detroit. Professor Goode, as already stated, visited the principal harbors of Europe and those of New York, Boston and Philadelphia.

The Commission has not undertaken to prepare detailed plans nor to carry on technical engineering studies. The appropriation at its disposal would have been inadequate for such purposes. The original appropriation of $5,000 was supplemented by an additional $3,500, making a total of $8,500. With this amount, engineering studies and detailed plans would have been out of the question. The Commission has aimed to deal with the broader phases of Chicago's water shipping problem and to outline the larger features of harbor policy which it believes should guide the city. It has indicated, too, the lines in which it believes detailed engineering studies are necessary and has recommended that the city make immediate provision for such. There are some features of the harbor work which should be undertaken at once, such as river improvement and the construction of piers north of the mouth of the river. Competent experts should be selected by the city to make plans and supervise them. With respect to some of the more important plans of ultimate harbor development, the Commission believes that a further inquiry by technical experts should precede their formulation and that portions of the lake front which it was planned to dedicate exclusively to park uses should be so developed as not to preclude the possibility of the development of some harbor and dock facilities; in other words, that park development should be so designed as to permit later adaptation to harbor uses, if such adaptation be desirable. Since there is rea-

sonable room for doubt (in view of the recommendations of the Commission for extensive developments elsewhere) as to the necessity, now or hereafter, of any harbor development on the Lake Front between Grant Park and Jackson Park, it would seem that the harbor experts should be asked to make their plans so as to interfere as little as possible with the immediate necessities of parkway development. (For specific treatment of this subject see "The Lake Front," pages 38 to 43.)

The Harbor Commission has treated the entire area from Waukegan to Gary as one great industrial community, of which Chicago proper is the natural center. It believes that neither Chicago proper nor the Calumet region can gain anything from obstructive competition, but that the welfare of the entire community will be advanced by the highest development of each region.

Appended are copies of Mayor Busse's messages to the city council relative to the Harbor Commission and resolutions and acts of the city council in connection therewith. Copies of laws of the General Assembly of Illinois of 1903 and 1907, under authority of which the Board of South Park Commissioners plans to take possession of large portions of the lake front for park purposes, are published in the Appendix, page 255.

## MESSAGE OF MAYOR BUSSE TO CHICAGO CITY COUNCIL, JANUARY 6, 1908.

*To the Honorable, the City Council:*

GENTLEMEN:—I desire to call your attention to the pressing need of giving careful and comprehensive consideration at the earliest possible date, to the question of Chicago's harbor facilities. It is a notorious fact that the lake commerce of Chicago, once the pride and boast of this city, has been steadily decreasing for a number of years. This city now, I believe, ranks fourth in lake commerce where once it stood first and far ahead of its nearest competitor. Without counting the ore shipments from the iron beds of the Northwest, the City of Duluth, which is but a pigmy compared with Chicago and which serves as a distributing center for a much smaller territory, ranks about even with this city in general lake commerce.

The one and only reason for Chicago's decline in this respect is the inconvenience and inadequacy of its harbor facilities. We have been inclined to rest easy in the belief that the tunnels formed practically the only obstruction to commerce in the Chicago River, and that the lowering of the tunnels will end all of our difficulties in this respect. I agree with many who have studied this question, that the tunnels constitute only a small part of the conditions which hamper shipping in the Chicago River. Even with the tunnels lowered to any depth, the largest boats in use on the Great Lakes would still find it difficult to make free use of the Chicago River on account of its narrowness and crookedness. Many millions of dollars could be spent in straightening and widening this river without making it in any degree adequate for the demands of lake commerce that ought to come to Chicago, for so long as we have bridges across the river (and we cannot do without the bridges), boats will be delayed in coming in and going out, and every such delay means a hampering of commerce in the matter of time and also high towing charges which are a burden upon the freight carriers. Similar reasoning applies to the harbor that has been developed at South Chicago, and with almost equal force. As the city grows in that vicinity, more bridges will be built over the Calumet River.

The time has come when Chicago must decide whether it will depend for the future, entirely upon the harborage afforded by the Chicago River and the Calumet River or whether it should not take steps to utilize at least some portion of its lake front for shipping purposes. Legislation was enacted at the last session of the General Assembly, which contemplates turning over to the various park boards, practically all of our lake front for development and beautification as adjuncts of our park systems. We are all proud of our splendid systems of parks and boulevards. We all want to see them grow, but no city, and particularly no strictly industrial and commercial city, such as Chicago is, can thrive on beautification alone. Lake commerce played a large part in making Chicago what it is. I do not believe it wise to ignore entirely that advantage which Chicago has by reason of its location, and it is only a question of time when that advantage will be lost, unless we secure other harborage facilities than those afforded by the Chicago and Calumet Rivers. If lake commerce cannot find convenient accommodation at Chicago, it will go to the harbors being developed just over the state line in Indiana, just as certainly as water runs down hill.

Practically all of our lake front that has not been already dedicated to park purposes, is that comparatively short stretch of shore line lying between Twelfth street and Jackson Park. Under the legislation enacted last spring, this will also be turned over to the South Park Board as soon as the War Department gives its consent. Holding the views I do on this whole subject, I have asked the Secretary of War to withhold this consent until the City of Chicago can consider and determine whether it may not desire to use some portion or all of this shore line between Twelfth street and Jackson Park, for

Copy of map accompanying message of Mayor Bauer to the City Council relative

commercial and shipping purposes, a copy of which communication is attached. If it should be determined that the lake front or some portion of it between Twelfth street and Jackson Park ought to be used for commercial purposes, I have no doubt that the national government, with its usual liberality in promoting commerce, could be induced to build a breakwater which would amply protect that portion of the lake front and make it an admirable harbor, surrounding such docks and other improvements as might be constructed either as private or municipal undertakings, to accommodate the shipping of the Great Lakes.

Consideration of this question of utilizing the lake front as indicated for shipping purposes, might properly include also, consideration of the ever present, very pressing railway terminal problem. While I have no fixed views on this part of the subject, I can see that it might be possible in developing a harbor on the lake front as indicated, to acquire sufficient land made by filling in the submerged land incident to building docks and breakwaters, which might serve railway terminal purposes. This, however, is simply incidental to the main proposition. Attached hereto is an outline map of the City of Chicago, showing the locations of the various parks and boulevards and the portions of the shore line already dedicated to park purposes; also showing that portion of the lake front which remains available for commercial purposes.

In view of the situation as I have undertaken to outline it in this communication, and if it meets with the approval of your Honorable Body, I respectfully ask the adoption of the accompanying resolution providing for a commission to make a comprehensive study of and report on this whole question.

Respectfully submitted,

FRED A. BUSSE,
*Mayor.*

## COPY OF MAYOR BUSSE'S LETTER TO THE SECRETARY OF WAR TRANSMITTED TO THE COUNCIL IN CONNECTION WITH THE MAYOR'S SPECIAL MESSAGE OF JANUARY 6, 1908.

*To the Honorable William H. Taft, Secretary of War, United States, Washington, D. C.:*

SIR:—There have been many plans suggested by different individuals and clubs contemplating extensive local improvements, the beautification of our city by parks, boulevards, etc., but the most comprehensive plan is the one that is now being prepared by the Commercial Club of this city. The plan is very broad in its scope, covering all Chicago. The territory lying west of the river and far to the north and south is as closely under consideration as the lake front or the downtown district. Although I favor this plan generally, I am not prepared at this time to pass upon all of its features. I desire particularly, however, to call your attention to one portion of this plan of which I do not approve; that is, the filling in of the lake on the lake front from Twelfth street to Jackson Park, a distance of five and one-half miles in length, for some little distance from the shore line, for park purposes, then lagoons, and beyond more park land, out to navigable water. This would forever prevent the city, should it wish to do so, from using this portion of its lake front for docks and wharves for commercial purposes, as at Duluth, Cleveland, Buffalo and other ports.

Statistics show graphically that the lake commerce of Chicago has been diminishing steadily, while Duluth and other lake ports have increased largely. The reason Chicago's lake commerce has decreased, I believe, is because of the many difficulties to navigation presented by the Chicago River, the narrowness of its channel, the crookedness of its course and the many bridges delaying progress of vessels upstream. The larger boats now making Duluth and other ports could not traverse the river at all.

There is no other portion of our lake front that could be used for this purpose which would be adequate.

Our State Legislature has given to the Park Commissioners practical possession of the entire lake front from near the north limit of the city, southward to the south end of what is now known as Grant Park in the neighborhood of Twelfth street and the Illinois Central Railroad Depot; that is, from the mouth of the Chicago River to points six miles north and one mile south; and they have also secured practical control of the lake front from Jackson Park (about six and one-half miles south of the Chicago River) down to the Indiana State line, a distance of about six miles, with the exception of the actual mouth of the Calumet River, and they have, during the last year, succeeded in passing a bill through the State Legislature by which they are given power to take possession of the remaining five and one-half miles between Grant Park and Jackson Park in such a way as to occupy it with a narrow strip of park, lagoons, etc., as above described, and to have power to prevent any roadway under, through or above this park from the city proper to the lake in its front, in such a way as to forever prevent the economical use of any of this lake front for piers and docks.

Thus the Park Commissioners can, at the present time, ignore the commercial interests of the City of Chicago in this matter unless the city be assisted by the Federal Government, acting in the interests of general commerce and navigation, to prevent the loss of this lake frontage for commercial purposes to the city forever.

Chicago has developed its wonderful prosperity from its commerce and manufactures. Its future growth, both artistic and practical, depends upon its commerce, and I feel that its growth and prosperity will be checked very largely forever if our lake commerce is retarded by the proposed plan of the Commercial Club and the Park Commissioners in respect to the lake front from Twelfth street to Jackson Park.

The development of our Chicago harbor by occupation of its lake front by piers and docks behind an exterior breakwater has been consistently advocated by the Federal Engineer Department since 1867, when Colonel Wheeler, then District Engineer Officer, as well as a special board of other able engineer officers, reported that the Chicago River was not then and never could be, in itself alone, able to take care of its growing commerce, and that the occupation of the Chicago lake front by piers and docks was a public necessity. Our river for ten years past has not taken care of our commerce, and is not doing so now—a large portion of the shipments and receipts going to Calumet, and soon will go to Indiana Harbor, passing us by.

The Lake Carriers' Association, representing the interests of the entire system of Great Lakes, is strongly of my opinion.

From Randolph street to Twelfth street, Chicago has its present Grant Park; Jackson Park on the lake front further south; Lincoln Park, now being enlarged, on the lake front on the north side of the city; and the city has its South Park, Humboldt Park, Garfield Park and many others.

I understand that the permission from you to fill in the land mentioned, to wit: from Twelfth street to Jackson Park, must be given before such work can be done legally, and I would therefore appreciate it if you would give me a hearing before granting such permission.

Respectfully yours,

FRED A. BUSSE,
*Mayor.*

(Through Lt. Col. William H. Bixby, in charge of U. S. Engineer Office, Chicago, Illinois.)

## COPY OF RESOLUTION CREATING THE CHICAGO HARBOR COMMISSION, PASSED BY THE CITY COUNCIL JANUARY 6, 1908.

*Resolved,* That the Mayor be and he is hereby authorized to appoint a commission of five (5), for the purpose of making a comprehensive study and detailed report to the City Council on Chicago's harbors, together with such recommendations as to harbor, railway terminal and park plans on and

along that part of the shore of Lake Michigan lying between Twelfth street and Jackson Park as it may see fit; and be it further

*Resolved,* That five thousand dollars ($5,000.00) be and it is hereby appropriated out of moneys not otherwise appropriated, for the purpose of defraying the expenses of said Commission.

## COPY OF MESSAGE OF MAYOR BUSSE TO THE CITY COUNCIL JANUARY 13, 1908, ASKING FOR AUTHORITY TO ADD TWO (2) MEMBERS TO THE HARBOR COMMISSION AS A MEANS OF GIVING THE CITY COUNCIL REPRESENTATION ON SAID COMMISSION.

*To the Honorable, the City Council:*

GENTLEMEN:—On last Monday evening your Honorable Body authorized the Mayor to appoint a commission of five for the purpose of making a comprehensive study and report on the harbor facilities of Chicago, as a first step toward determining whether it was advisable to reserve some portion of the city's lake frontage for harbor purposes.

I now respectfully request, if agreeable to your Honorable Body, the privilege of adding two members to said commission as a means of giving the City Council representation on said commission.

Yours very truly,

FRED A. BUSSE,
*Mayor.*

## EXTRACT FROM CITY COUNCIL PROCEEDINGS OF MAY 4, 1908, GIVING MESSAGE OF THE MAYOR ASKING AUTHORITY TO APPOINT ONE (1) ADDITIONAL MEMBER OF THE CHICAGO HARBOR COMMISSION, AND THE COUNCIL'S ACTION THEREON.

*To the Honorable, the City Council:*

GENTLEMEN:—I respectfully request the authority of your Honorable Body to appoint one additional member of the Chicago Harbor Commission so that the chairman of the Council Committee on Harbors, Wharves and Bridges may be made a member of said Commission.

Respectfully,

FRED A. BUSSE,
*Mayor.*

Alderman Foreman moved to concur in the request contained in the foregoing communication.

The motion prevailed.

# PART II.

## Text of Report.

### Section 1. Requirements of a Harbor.

The first requisite of a harbor is that it shall give anchorage and refuge for vessels in time of storm. It should be broad and deep enough to accommodate the largest vessels. These should be able to enter and move about under their own steam. It is desirable, though not essential, that vessels should be able to move from their anchorage to loading and unloading docks under their own steam, and so save the necessity of towing.

These requirements apply to all harbors, but at large cities provision must be made for the delivery of passengers arriving by vessel, and for the freight that is used in the city locally, including coal, fruits, vegetables and other merchandise. Such a harbor requires docks, warehouses and unloading facilities near, or convenient to, the heart of the city, and may be termed the "*city*" or "*commercial*" harbor. An entirely different class of requirements arises in connection with the handling of commodities which are in transit through the city or which are required for manufacturing. A harbor supplied with facilities for handling such traffic may be called the "*industrial*" harbor, and need not be near the heart of the city. It is desirable that such a harbor should be convenient to an industrial and manufacturing neighborhood. The industrial harbor bears about the same relation to a great city as do the freight yards, switch tracks, etc., of a railroad. The congestion which exists in large cities should not be increased by attempting to handle in the heart of the city the wares intended for manufacture or which are passing through or being transhipped from water to rail or *vice versa*.

All traffic through the city, or moving from lake to rail, or rail to lake, cannot be handled at an outside harbor. Some of this is high class package or fruit and vegetable freight which is carried by the same vessels that bring

to the city freight needed locally. Hence, the "city" harbor must provide for this "through" business and interchange of lake and rail traffic.

Great industries will naturally be located where land is reasonable in price and where additional property can be had for expansion. This is especially true of the iron and steel industry, where provision must be made for handling immense quantities of iron ore and other raw materials, and disposal of the product. The same is true to a lesser extent of the lumber and grain business, and all classes of what is sometimes termed "heavy manufacturing."

An essential requirement, both for the "city" or "commercial" harbor and the "industrial" harbor, is provision for easy and convenient interchange of boat and rail traffic. The cost of each rehandling, unless the facilities for transfer by labor-saving machinery be exceptionally efficient, may easily amount to more than any possible economy in the cost of transportation.

Sightliness is not a requirement for purposes of navigation, but there is no good reason why structures devoted to shipping uses should not be pleasing to the eye. In some European ports much thought is given to artistic harbor development with gratifying results.

Of the harbors on the Great Lakes, that of Duluth best satisfies the requirements of navigation. Protected as it is by a natural breakwater within which ample anchorage room is easily provided by dredging, vessels are safe from storm. It is seldom necessary for boats to call tugs to their assistance in order to make dock landings. The facilities for rapid handling of large quantities of commodities, especially iron ore and coal, are remarkable for their excellence. The railroad and boat lines meet under conditions calculated to facilitate interchange. Warehouse accommodations are plentiful. Duluth combines an outer harbor and river harbor, either of which can be entered by the largest vessels navigating the lakes.

Buffalo and Milwaukee have river harbors, but the difficulties which they offer to navigation are much less than those encountered in the Chicago River. Even the river harbor of Cleveland, with its winding channel, affords

easier access to vessels for a considerable distance from the mouth than does the Chicago River. The navigation of the river in Cleveland is subject to fewer obstacles of bridges or current.

The problem of providing an adequate commercial harbor for Chicago, as distinguished from South Chicago, presents serious obstacles, but the opportunity to provide extensive industrial harbor facilities in the community of which Chicago is the center is exceptionally good.

Harbors and docks alone do not make a great port. The mere existence of magnificent harbor possibilities, from the engineering point of view, will not create commerce where conditions do not favor its development. This point was well stated in the engineering report of Luther Wagoner to the Federated Improvement Associations of San Francisco, outlining a plan for the development of the port of San Francisco. The following extract from the report is here inserted because it seems pertinent despite the fact that Chicago is not a seaport city and navigation interests are fostered for the sake of maintaining and promoting a highly desirable, yet supplementary means of transportation.

> "Three factors determine the commercial supremacy of a city by the sea: First, its potential tributary commerce; second, the size and accessibility of its harbor; and, third, the development of its docks to meet the requirements and accelerate the increase of its commerce.
>
> "Of the three, the volume of the commerce, actual and potential, is fundamental. Good harbors on barren coasts do not make great seaports. But where a tributary interior territory exists, rich in agricultural and mineral possibilities, and capable of supporting a large population, it is sufficient to transform shallow inlets into deep and commodious harbors at the points where the lines of intercourse of its maritime and interior trade converge. Where the hinterland is rich in resources, and a natural harbor already exists, capable of receiving the commerce of the world, it is evident that the acceleration of the growth of the port

will depend on the remaining of the three factors—that is, the development of the docks.

"Such are the conditions at San Francisco. Its natural harbor is unsurpassed and there are no physical limitations to its tributary trade. Its ultimate ascendency will, therefore, be determined, in large measure, by the provision of liberal docks and wharves, with all the mechanical appliances which facilitate the transfer of merchandise and passengers from rail to water and from water to rail, without delays or confusion."

Chicago's hinterland is as rich and promising as that of any harbor in the world. The possibilities of Chicago, located in a remarkably rich agricultural and stock-raising area, adjacent to abundant coal fields and possessed of unsurpassed advantages as a manufacturing and jobbing center, are almost unlimited. Chicago already has commerce that not only warrants, but imperatively demands, better harbor facilities.[1]

## Section 2. Chicago's Water Shipping.

The volume of shipping on the Great Lakes is increasing at a rapid rate. The Summary of Commerce and Finance shows that the freight tonnage on the Great Lakes has more than doubled since 1900. The figures are as follows:

| | TONS OF FREIGHT HANDLED. |
|---|---|
| 1900 | 37,393,733 |
| 1901 | 45,007,019 |
| 1902 | 54,074,729 |
| 1903 | 56,702,630 |
| 1904 | 49,369,582 |
| 1905 | 65,395,161 |
| 1906 | 73,178,215 |
| 1907 | 81,123,687 |

[1] At the same time, your Commission recognizes that it is not so much *more* docks as *better* docks that Chicago needs. In other words, modern vessels and modern docks are equipped with facilities for rapid loading and unloading, and under such conditions one good dock takes the place of several poor ones, besides diminishing the cost of handling and vessel demurrage.

The freight movement through the Soo, which was 58,217,214 net tons[1] in 1907, has more than doubled in the past ten years. The freight movement of 81,000,000 tons on the Great Lakes in 1907, is classified approximately as follows:

| | PER CENT. |
|---|---|
| Iron ore and other minerals (except coal) | 58 |
| Lumber | 3 |
| Grain and grain products | 7 |
| Hard coal | 5 |
| Soft coal | 19 |
| Unclassified, including merchandise, fruits and vegetables | 8 |
| | 100 |

The receipts and shipments of the port of Chicago (including both the Chicago and the Calumet harbors) for 1907 were 11,410,470 net tons. Of this sum, the receipts were 8,564,754 and the shipments 2,845,716 net tons.

The receipts and shipments by water in the port of Chicago for the year 1907 may be classified in percentages as follows:

| | RECEIPTS. PER CENT. | SHIPMENTS. PER CENT. |
|---|---|---|
| Iron ore and other minerals (except coal) | 62.35 | .63 |
| Lumber | 8.58 | .07 |
| Grain and grain products | .21 | 72.00 |
| Coal (both hard and soft) | 16.51 | 4.03 |
| Unclassified | 12.35 | 23.27 |
| | 100.00 | 100.00 |

It will be seen that the proportion of unclassified freight to the total volume of freight handled is much higher for Chicago than for the Great Lakes as a whole.

An analysis of the statistics of traffic for the port of Chicago shows that it has just about held its own during the past decade. The following table is compiled from fig-

[1]The figures given herewith are for net tons of 2,000 pounds each.

ures furnished by Mr. John C. Ames, collector of customs at Chicago:

| YEAR. | NUMBER OF VESSELS ENTERED AND CLEARED. | TOTAL TONNAGE OF VESSELS ENTERED AND CLEARED. | TOTAL TONNAGE OF CARGOES RECEIVED AND SHIPPED. |
|---|---|---|---|
| 1897 | 17,799 | 14,214,169 | 10,643,877 |
| 1898 | 18,512 | 15,116,426 | 11,509,180 |
| 1899 | 16,174 | 12,599,239 | 12,319,238 |
| 1900 | 16,966 | 13,990,894 | 9,659,744 |
| 1901 | 16,274 | 13,634,904 | 10,179,519 |
| 1902 | 15,754 | 14,239,398 | 9,669,472 |
| 1903 | 14,823 | 15,032,109 | 10,847,779 |
| 1904 | 12,922 | 12,752,591 | 8,174,332 |
| 1905 | 13,981 | 14,508,270 | 9,919,380 |
| 1906 | 13,594 | 15,405,200 | 10,302,112 |
| 1907 | 12,836 | 15,649,035 | 11,410,470 |

Contrasted with the figures of actual freight tonnage for Chicago, Duluth shows a gain from 4,776,080 net tons in 1897 to 19,635,809 in 1907; synchronous, and of course due to the development of the immense bodies of iron ore near Duluth; the Vermillion and Mesabi ranges having been opened just prior to that period. Cleveland has doubled its traffic in the same period, the freight for 1897 being 6,118,731 net tons, as compared with 12,247,627 net tons for 1906. Milwaukee traffic has risen from 3,750,346 net tons in 1897 to 7,696,002 in 1907. The harbor of South Chicago shows about the same gain as Milwaukee, the figures of freight tonnage for South Chicago being 3,493,218 net tons for 1897 and 6,430,347 for 1907. The traffic tonnage of the Chicago River Harbor, as distinguished from the Calumet River Harbor, or South Chicago, shows a decrease for the same period from 7,149,759 net tons in 1897 to 4,980,127 in 1907. The gain in the Calumet River Harbor, which offsets the loss in the Chicago River Harbor so as to make the traffic figures for the port as a whole, stand approximately constant, is made up entirely of receipts of iron ore. Except for such iron ore receipts, the traffic figures for the Calumet River Harbor remain about the same. In other words, the Calumet River Harbor has not gained the traffic which the Chicago River Harbor has lost, for the iron ore receipts,

which constitute the increase in Calumet traffic, would not have come into the Chicago River Harbor.

It should be borne in mind that figures as to freight tonnage or mere weight of commodities carried may be misleading because they take no account of comparative values. Neither weight nor value alone is a correct measure of the importance of traffic to a port. Both must be taken into account. It has been customary in the past, however, to deal with tonnage statistics as if they alone constituted the true basis of comparison. If the estimate made by the Federal authorities as to the value of unclassified freight passing through the Soo Canal is reliable (average $150 per ton) and may be safely taken as the average value of unclassified freight handled at the port of Chicago, we arrive at the conclusion that the value of this freight received and shipped at this port is close to $260,000,000 annually.

The falling off of Chicago River Harbor traffic has been in lumber, coal, grain and iron ore. There has been an increase in the quantity of unclassified freight, though it has not been as marked as for the ports of Milwaukee and Duluth. Duluth's greatest increases have been in iron ore and grain, with a substantial increase in coal. Milwaukee's chief gains have been in coal and unclassified freight.

It is, perhaps, significant that Milwaukee's water commerce has increased more than its rail commerce, while, in the case of Chicago, the reverse is true. (See table in appendix, page 298.) Milwaukee receipts and shipments by water of specified principal commodities (flour, wheat, corn, coal, iron ore, lumber, salt and sugar) rose from 1,420,943 net tons in 1887 to 5,289 976 tons in 1907. Milwaukee's rail traffic in the same commodities rose from 1,661,296 net tons in 1887 to 2,932,411 tons in 1907. Chicago's total lake receipts and shipments of the same commodities rose from 6,159,950 net tons in 1887 to 10,178,014 tons in 1907. Chicago's rail traffic in those commodities rose from 12,240,761 tons in 1887 to 29,645,991 tons in 1907.

### General Interest in Waterway Development.

The time is opportune for Chicago to recover its lost water shipping because of the general movement for water-

way development throughout the country, and indeed throughout the world. The Panama Canal is one phase of this activity. The Canadian Government is considering extensive waterway improvements, among them the Georgian Bay Canal, from Georgian Bay to Montreal, by way of Lake Nipissing and the Ottawa River. The estimated cost of this project, which calls for a channel twenty-two feet deep, is $100,000,000. Deepening the Welland Canal to twenty-two feet and enlarging it to meet the needs of the modern lake freighter is being agitated. If this is done, deepening and enlarging the St. Lawrence Canals will be the logical sequence. The State of New York has authorized the expenditure of $101,000,000 for the enlargement of the Erie Canal. Illinois at the election of November 3, 1908, authorized the issuance of bonds to the amount of $20,000,000 to carry nearer to completion the Lakes-to-the-Gulf waterway, of which the Sanitary District Canal constituted the first step. The improvement of the water courses of the Central West will contribute to Chicago's wealth and greatness if she be prepared to take advantage of it. The United States has included the systematic development of American inland waterways in its broad policy of conservation of national resources. A special Inland Waterways Commission has been appointed by President Roosevelt to investigate this question, and, apparently, our rivers and harbors are about to be exploited on a large scale.

## Chicago's Advantageous Location as a Commercial and Industrial Center.

The general location of Chicago, with reference to water transportation is especially advantageous. With the construction of the Lakes-to-the-Gulf waterway to the south, enlargement of the Erie Canal and possible opening of new Canadian waterways to the Atlantic seaboard, this city will be the focal point for water routes, both east and south. The building of Gary is a recognition of the southern end of Lake Michigan as a natural meeting place for iron ore from the lake regions on the north and fuel from the east and south. Such plants provide cheap iron and steel as the basis for manufacturing industries that

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find this general location desirable for that and other reasons, among them nearness to cheap fuel. The possibility of cheap water power from the Sanitary District Canal and from the waterway to be constructed by the State between Joliet and Utica, constitutes additional inducement to seekers for manufacturing sites. The locality meets the prime requirements for a great industrial harbor. It offers large tracts of cheap land, available for factory sites, along its vast stretches of water, either actually navigable or easily made so, and accessible to railroad switch tracks. These stretches of water are the branches of the Chicago River, the Sanitary District Canal, the river courses of the Calumet region and Calumet Lake. The Corn Products Company, with its extensive plant, recently located on the banks of the Sanitary District Canal just outside the city limits, is evidently but a forerunner of others certain to be attracted by the advantages offered.

Geographical Chicago—Waukegan to Gary—constitutes one great industrial community and should be regarded as such. While Indiana Harbor and Gary are located in Indiana, and hence can have no political union with Chicago, these points, for other than governmental purposes, form a part of the great industrial community centering about the city. The people of Chicago should take a broad view of the situation and assume the leadership of the movement for the highest development of all transportation, industrial and commercial facilities of the entire industrial area of which it is the center. There should be no jealousy between Chicago and South Chicago, both parts of the same city. While each is entitled to the highest development of which it is capable, neither has anything to gain from retarding the natural growth of the other's water transportation facilities. The growth of any part makes for the prosperity of the whole.

### Possible Increase of Chicago's Water Shipping.

It is the opinion of the Commission that the water shipping of Chicago may be materially increased in important lines and the decline of shipping in other lines checked, by the development of better harbor, dock, warehouse, loading and unloading facilities. This development should be pro-

moted, both in Chicago proper and in the Calumet region. The Commission believes that manufacturing may be greatly stimulated by the development of the industrial harbor facilities of the Chicago industrial area, extending from Waukegan, on the north, to Gary, on the south. The development of adequate harbor and waterway facilities will do much to foster Chicago's supremacy as a railroad center and insure to the community the best service and the lowest rates from rail carriers.

The principal commodities of lake traffic are iron ore, grain, coal, lumber and unclassified freight. Of these commodities, iron ore is not likely to come into the Chicago River Harbor in any great quantity nor is it wanted there, if it means blast furnaces in the populous part of the city. It might, some day, be desirable for the ore carrying boats to be able to pass into the Sanitary District Canal to reach plants on that canal, well removed from the central area of Chicago. The iron ore is wanted in the Calumet region and already goes there in large quantities. It is important that Calumet River Harbor development be such as to foster the ore-carrying movement to that region.

The movement of coal and lumber into the Chicago River Harbor and of grain out is declining. With regard to lumber[1], at least, the decline has been due chiefly to natural causes, that is, to the diminishing supply of timber available for water transportation. Nevertheless the decline could have been lessened by better harbor and terminal facilities. This is especially true of coal, the receipts of which at Milwaukee have grown enormously at the same time that Chicago has been losing. Because of navigation difficulties, the current being assigned as the chief, the boat rate on coal from Lake Erie ports to points on the South Branch of the Chicago River is 10 cents a ton higher than to Milwaukee, South Chicago or even to points on the North Branch. The coal unloading facilities in the Chicago River Harbor are inferior to those at other important lake ports, notably Duluth and Milwaukee. Improvement of the navigation features of the river would naturally lead to the introduction of better handling facilities. At present

[1]The removal of the duty on lumber might stimulate the movement of this commodity from Canada to Chicago by water.

the boats that bring iron ore to the Calumet region ordinarily return light. In the future the number of ore-carrying boats to enter that region and Gary will be much greater, hence it would seem that it should be possible to utilize these boats for the development of a traffic in Illinois and Indiana coal northward.

While it may be true that large increase of water traffic in lumber, grain and coal may not be realized, it is important that Chicago provide facilities to keep such traffic as we already have in these lines. As communities develop diversified industries, freight movements of a miscellaneous character become much larger in proportion than that of raw commodities which under more primitive conditions constitute almost the entire bulk of the traffic. The most important increase in the future lake traffic of the Chicago River Harbor, if adequate facilities are provided therefor, is likely to be in the lines of package freight, fruit, vegetables and miscellaneous commodities.

Better facilities for the handling of passenger business would undoubtedly lead to a considerable increase in that traffic. While the passenger season is a short one, it is important to the entire population of the Mississippi Valley. The City of Detroit, which offers exceptional facilities for excursions by water to nearby points on Lake St. Clair and on the Detroit River, and to more distant points on Lake Huron, Lake Superior and Lake Erie, handles a big volume of passenger business and in consequence attracts to its city a large number of people. There is no doubt that with better facilities for docking boats, and for the comfort of passengers in arriving and departing, the business could be greatly increased.

Two million passengers are carried in and out of the Chicago River each year. While a large proportion are day excursionists, the number of other passengers is greatly increasing and will become larger if proper facilities are furnished.

As the average amount expended in Chicago by each passenger largely exceeds the carrying charges on several tons of freight, this branch of lake traffic should receive especial attention.

Because the tonnage of package freight, fruit, vegetable

and miscellaneous cargo—which appears in the statistical tables under the name of unclassified freight—may seem small compared with that of the great bulk commodities, its importance is often overlooked. According to government estimates, the value of the 1,134,851 net tons of unclassified freight moving both ways through the Soo in 1906 was approximately $48,000,000 more than that of the 35,337,042 net tons of iron ore passing through the same channel the same year. Present facilities are not adequate to the proper handling of the existing passenger and unclassified freight business in the Chicago River Harbor. Improvement of facilities will certainly lead to heavy augmentation of the volume of lake traffic in these lines.

### Lakes-to-the-Gulf Waterway.

A Lakes-to-the-Gulf waterway would afford water transportation to and from the Gulf of Mexico, and give easy access to the Panama Canal. If the movement for improvement of the tributaries of the Mississippi River shall be successful, the Lakes-to-the-Gulf waterway will give Chicago water communication with all the vast area reached by these water courses. Through these routes Chicago manufacturers and jobbers may distribute their goods to a large and rapidly growing population. Lumber and coal may be brought in from the south. Ultimately, the raw cotton of the South may be brought to mills to be developed in this area. Sugar, coffee and the less perishable tropical products will also make use of such a route. It is probable that in the future traffic north and south between Temperate and Tropical Zones will increase more rapidly than that east and west.

To derive the highest benefit from the Lakes-to-the-Gulf waterway, Chicago must be provided with adequate water terminal facilities for the handling, storage and transfer of goods. The question of a satisfactory northern outlet or connecting channel with Lake Michigan for this waterway, becomes a matter of fundamental importance. This subject will be discussed in this report under the heading of "The Sanitary and Ship Canal."

## Industrial Development.

Chicago possesses great advantages as a manufacturing center, and these advantages may be still further added to by an industrial harbor development, that is, by the increase of navigation facilities of the water channels that traverse areas peculiarly adapted to manufacturing purposes. Even if a great freight harbor were to be developed on the lake front it would be a city or commercial harbor, rather than an industrial harbor. Factories would not, by choice, locate on the valuable land available on the lake front. They would naturally be established along the branches of the Chicago River, the Sanitary and Ship Canal or in the Calumet region if these offered adequate rail and water transportation. It is quite as important to furnish facilities to promote this industrial development as to provide for a city or commercial harbor, near the wholesale district, for obviously, the main commercial harbor should be located as near as possible to the great commercial center of the city. While the interests of the entire city call for the fullest development of the Calumet Harbor, for both commercial and industrial purposes, the Calumet region cannot properly satisfy the needs of Chicago for a commercial harbor. If commerce is to be satisfactorily served, competent commercial harbor facilities must be provided at Chicago proper as well as at South Chicago. The Calumet region, however, as well as the Sanitary and Ship Canal, afford exceptional advantages for industrial harbor development, and the improvement of the area should be favored in the interest of the entire community.

The amount of traffic that will follow from such development cannot be predicted with mathematical accuracy. It is clear, however, that the facilities of to-day are not equal to the needs of commerce, especially the passenger, package freight and fruit business. Substantial development is not only warranted, but demanded by the conditions. Its extent and character cannot be determined at this time. The immediate steps recommended are improvement of the Chicago and Calumet Rivers and the creation of a harbor north of the mouth of the Chicago River, as more fully explained hereafter.

## Water Facilities and the Railroads.

An important reason for favoring harbor improvements for Chicago and indorsing a general waterway development is the influence which water routes have and probably always will have upon railroad service and rates. Without intending disparagement or criticism of railroad service or rates, it is generally recognized that water routes give the community they serve a valuable alternative means of transportation. Were water routes lacking it is probable that the geographical advantage of this community would be lost by the railroads putting all communities, regardless of size or importance, on a parity. There is a tendency to base rail rates on distance and cost of service. The chief and only well recognized exception is when rail rates are affected by the competition of water transportation.[1]

Chicago to maintain its pre-eminence and the advantage which it gains from its geographical location, should never lose sight of the importance of its water gateway, even though the actual tonnage handled by water may not amount to more than 5 per cent. of the total business done.

## Harbor Improvements Elsewhere.

Other cities, both in this country and Europe, have been pursuing a more vigorous policy with reference to harbor improvement than has Chicago. The federal government, too, has done more for other harbors, as will be seen by reference to tables and charts published as an appendix to this report. (See pages 263-266.) Of congressional appropriations for nine United States harbors, Chicago's total for the past twenty years is the lowest, in proportion to population, while that for Duluth-Superior is the highest. In absolute amounts received, Chicago stands sixth. The appropriations for Chicago are for the port, including the Calumet River as well as the Chicago River Harbor. Of the total amount for the past twenty years

[1]This tendency is promoted by the fact that the rates made by legislative authority and by public service commissions are almost invariably on the distance basis. (e. g. See the Distance Tariff promulgated by the State of Illinois and many other states, the so-called "long and short haul" clause of the Interstate Commerce law, etc., etc.)

($4,143,187), about half was devoted to the Chicago River and Harbor and half to the Calumet River and Harbor.

During the past year San Francisco has had an expert make a careful study of the needs of its harbor. His report outlines a plan of comprehensive harbor development to cost approximately $50,000,000 and specifically recommends that improvements to the value of $10,000,000 be made in the next ten years.

New York City, in 1870, established the policy of municipal ownership of dock property and since that time has been purchasing water frontage and building docks. The amount expended by the dock department, between 1870 and 1907, both inclusive, was $89,292,109, of which $24,582,-599 was for the purchase of property. In addition, the expenditures of the federal government for improving New York Harbor have been, for the years 1886 to 1907, $9,529,-360.

Philadelphia has organized a Harbor Commission with large powers. Boston and Baltimore are making harbor improvements that will involve the expenditure of many millions of dollars. New Orleans and Galveston are also alive to the needs of their commerce.

The development of the leading European ports are described in the special report by Professor J. Paul Goode, published in Part IV. A brief resume of what he says on this subject follows.

The Clyde Navigation, the public trust having the port of Glasgow in charge, has spent in the development of the port from 1860 to date, $44,000,000. This sum has been earned on the business of the port, the annual income being now about $3,000.000. Even with this expenditure the traffic demands upon the port are growing faster than the facilities. The Mersey Docks and Harbor Board, the port authority at Liverpool, spent $150,000,000 from 1859 to July 1, 1907, in attempting to keep pace with the demands of her growing commerce. The annual income of this board is about $7,000,000. Every increase in port facilities has been overtaxed before completion. The latest addition was adopted last May, when plans were approved for a dock large enough to accommodate half a dozen vessels 1,100 feet in length, the cost of this one unit being $16,000,-

000. Since 1885 the City of Manchester has spent $85,000,000 on a ship canal to her own docks, thirty-five and one-half miles from the sea. During the last year the canal has been deepened from twenty-six to twenty-eight feet to meet increased demands. Newcastle, since 1860, has spent about $85,000,000 on the harbor. The City of Bristol, in about the same time, has spent $25,000,000 in bringing her harbor to modern requirements. Havre is doubling her harbor capacity. Her present contracts for dredging and sea walls alone call for an expenditure of $17,000,000. In the last thirty-four years the traffic of Antwerp has increased seven-fold and to provide for this growth about $45,000,000 has been expended upon harbor facilities. Accommodations have never met the demand for space and a new extension has been agreed upon, which will double the present capacity of the port and will cost $55,000,000 more. Rotterdam in deepening a ten foot channel spent $9,000,000 and the traffic of her port increased fourfold in seventeen years. In addition the city has spent $20,000,000 on harbor conveniences and now needs to double her harbor capacity. Since 1860 Hamburg has created a harbor unrivaled among the ports of Europe. Since 1880 the city has expended $100,000,000, yet has never been able to keep pace with the growth of the port. Bremen, Marseilles and Genoa, all show similar enterprise in developing suitable means for water traffic.

### Section 3. The Chicago River.

In October, 1830, Mr. J. M. Bucklin, civil engineer employed to make surveys for locating the Illinois and Michigan Canal, reported as follows: "From the mouth of the Chicago River to the point fixed as the entrance to the canal, there is no obstruction whatever to its navigation by boats drawing under five feet for that distance, which is five miles." (See Brown's Drainage Canal and Waterway, page 179.) This report was in advance of actual work upon the canal, which was begun in 1836.

The canal authorities duly empowered, reserved strips of land along the river for tow path and dock uses. One of the canal maps, dated 1834, shows streets reserved along the river banks on each side, from Madison street to State

street. The scale of this map is not entered upon its title, but it is about 1 inch to 400 feet. The main river scales about 250 feet and the South Branch 200 feet, and the adjoining parallel streets about 66 feet each, a total reservation on the South Branch of 332 feet in width.

The narrowest place in the river up to 1903 was just southwest of Twenty-second street, where it had been reduced to 116 feet in width. On June 19, 1901, the Sanitary District adopted the recommendations of its chief engineer for a 200-foot river, 16 feet deep at dock lines, increasing to 26 feet in depth for the central 100 feet.

The encroachments on the river by private interests were possible because the city failed to provide for responsible supervision.

Prior to 1894 the federal government appropriated nothing toward improving the Chicago River.

| | |
|---|---|
| The first appropriation made was included in the act of August 18, 1894 | $ 25,000.00 |
| Subsequent appropriations were as follows: | |
| Act of June 3, 1896 | 50,000.00 |
| Sundry Civil Act, June 4, 1897 | 113,000.00 |
| Sundry Civil Act, July 1, 1898 | 400,000.00 |
| Sundry Civil Act, June 6 1900 | 62,000.00 |
| Act of June 13, 1902 | 306,457.00 |
| Received from sale of earth | 1,721.12 |
| Act of March 2, 1907 | 300,000.00 |
| Act of May 28, 1908 | 193,000.00 |
| | $1,451,178.12 |

These figures are reported by Major Thomas H. Rees, under date of October 10, 1908. This money has been used to deepen the main river to 21 feet, the South Branch and the Stock Yards Fork to 17 feet, to improve the North Branch and to create two turning basins, one on the North Branch, at North avenue, and one on the South Branch, at Ashland avenue.

The Sanitary District project reversed the flow of the Chicago River and created a slope away from the lake, with the shallowing of the Stock Yards Fork to less than 17 feet. To remedy this, the branch was deepened to 20 feet, or three feet below the bottom grade established by the federal government at that time. The government

project for 21 feet was dependent upon the removal of the tunnels, which was finally accomplished early in the year 1908.

The total expenditures by the Sanitary District for river improvement, including lands, bridges, dredging and dockage up to December 31, 1907, was $10,063,402.07.

The completion of the work now in hand by the Sanitary District will provide a channel in the South Branch and the Sanitary District Canal two hundred feet wide, deep and straight enough to float any vessel which plies upon the Great Lakes. Serious obstacles exist in the main river, between Lake street and the mouth of the river which prevent the passage of any vessel more than 450 feet in length, beyond Lake street; hence, the recommendation of the Commission for removing these obstacles and for widening and straightening the main stream. There are 500 vessels plying the Great Lakes over 200 feet and under 400 feet in length, which can use our restricted channel; but all large modern boats (over two hundred in number) find navigation very difficult, or actually impossible. The difficulty of handling large boats in a narrow and tortuous channel, through frequent draw-bridges, is increased by the current created in the river by the Sanitary District Canal.[1]

[1]The ownership of the banks of the river, in a very large measure determines the uses to which it may be put, and this is especially true when the ownership is in large public service corporations. For this reason it will be of interest to note the ownership or occupation of the banks of the river, for example, in the stretch from Lake street to and beyond Sixteenth street. Beginning at Lake street on the west bank, the ownership is as follows:

Large warehouses from Lake to Randolph; a narrow strip of property between the railroad tracks and the river belonging to the Sanitary District from Randolph to Madison; Madison to Harrison, railroad property; Harrison to Polk, partly railroad property and partly large wholesale warehouses; Polk to Taylor, manufacturing property; Taylor to Twelfth, manufacturing property; Twelfth to Sixteenth, railroad property; Sixteenth to Eighteenth, large wholesale warehouse and railroad property; beyond Eighteenth street the property on the west and north bank includes many docks and slips, with coal wharves, railroad, manufacturing and lumber property.

On the east side of the river beginning at Lake street, the ownership or occupation is as follows:

Lake to Washington, warehouses; Washington to Madison, electric light and power plant; Madison to Van Buren, occupied chiefly by wholesale mercantile houses; Van Buren to Harrison, partly vacant, but mostly occupied by large mercantile buildings and by a power house and a wholesale house; Harrison to Twenty-first street, the property on the east side is entirely in railroad ownership; south and southwest of Twenty-first street, the south and east bank of the river is occupied by slips and docks, the ownership being partly in railroads, but largely in lumber and large manufacturing plants.

## Bridges.

There are now no railroad bridges across the main river,[1] but of the five highway bridges, three have center piers. The center-pier bridges are at Rush, Clark and Wells streets. One, that at Wells street, is a double-deck structure, the upper deck being used by the Northwestern Elevated Railroad Company. The narrowest navigable width in the main river is at Clark street, where one bridge draw is 67.8 feet and the other 67 feet.

From the mouth of the harbor to the point where the South Branch of the Chicago River connects with the Sanitary District Canal, at Robey street, the number of bridges, both city and railroad, crossing the main river and South Branch, is 26. Of these, 10 are center-pier bridges. Spanning the Sanitary District Canal, are eight highway and seven railroad bridges, all of which are built to swing, but have not yet been equipped with operating machinery. It is expected these bridges will be in operation in the year 1910.

From the main forks of the river to Belmont avenue, the head of navigation on the North Branch, there are nineteen bridges, of which ten have piers in the center of the stream. There are four bridges across the North Branch Canal, east side of Goose Island.

In recent years the federal authorities have required new bridges on the main river and South Branch to be built with a minimum clear span of 140 feet. The bridges with narrower span, which still exist, especially those of the center-pier type, are serious obstacles to navigation.

Even where bridges of the bascule type have a clear span of 140 feet, the abutments projecting into the river where the width of the stream is in excess of 140 feet, as it is at most points, constitute obstacles. This is especially true at bends. The new State street bridge located at a bend in the river is an illustration. The abutment projecting into the stream from the convex bank interferes seriously with navigation. On straight sections of the river the projecting abutments are less objectionable.

[1]The Illinois Central once had a bridge at the mouth of the river, which was removed by order of the federal government in 1904.

During the past year the question of the proper span for bridges over the Chicago River has been much discussed. In April last, the Harbor Commission sent to the Mayor a communication suggesting the desirability of a clear span of 200 feet for all bridges hereafter built. It developed that a contract was about to be let at that time for a new bridge at Polk street with a clear span of only 140 feet. The obstacles to making the bridge 200 feet wide at that point were represented as being especially great because of peculiar physical difficulties and because of the increased cost of 200-foot span bridges and damages to adjoining property. Inasmuch as the appropriation for this bridge had been made, the plans approved and bids accepted, the Commission informed the Mayor that it did not desire to oppose the progress of this particular improvement, without, however, abandoning its position as to the desirability of a 200-foot span for bridges over the main river and South Branch.

The prospective deep waterway to the Gulf furnishes another reason for making the river at least 200 feet wide at all points if it is to serve as the connecting channel between that waterway and Lake Michigan.

The principal objections advanced against 200-foot span bridges were: First, additional cost of 200-foot span bascule bridges; second, damage caused to adjacent property in building such bridges.

It is the belief of the Commission that these objections have now been removed. Two reliable bascule bridge engineers assure us that a 200-foot span bascule bridge, which they are willing to guarantee, can be successfully operated, and that such a bridge can be erected at a moderate additional cost, without seriously damaging adjacent property. If the city demands bridges with a clear span of 200 feet, bridge engineers will meet the need.

If there were no bridges no one would seriously contend that 30-foot projections into the river from both banks would not interfere with navigation. It would be as foolish to so contend as to argue that corresponding projections into the street would not embarrass team traffic.

Projecting abutments increase the current, obstruct a

free flow of water, and permit accumulations of ice and debris which impair the efficiency of the river from a sanitary point of view. Experience has shown that these cannot be eliminated by by-passes.

When the river is improved to permit the entrance of the largest boats, provision should be made for ease, convenience and safety of navigation. Unless this is done the additional charge now made on shipments to points in the South Branch will not be removed. The river should be wide enough so that two vessels may pass each other through the bridges. A bridge with a span of only 140 feet does not allow sufficient room for the easy passage of two large boats at the same time. Their combined cross-sections would so crowd the stream as to dangerously increase the current. Practical vessel-men assert that increased current through the draws interferes more with navigation than the bridges themselves. (See page 33.)

Comparisons of Chicago with Cleveland and Buffalo are not in point, as Captain Hamilton testified at the hearing before the Executive Committee of the Chicago Association of Commerce on the widening of bridge spans on the Chicago River, because in Buffalo and Cleveland the few bridges that exist are, with two exceptions, at least 700 feet apart, and in most instances the distance between bridges is even greater.

The 140-foot span bridges were adopted at the time, with the consent of the Government, because all parties interested were willing to accept any improvement upon the wretched conditions then existing.

The Commission, therefore, recommends the adoption of the plan to build all bridges with a clear span of 200 feet.

Arched bridges constitute a serious impediment to the convenient use of the river by tugs and lighters. Because of the arch, they must pass directly beneath the center of the bridge. On account of the current in the river or of adverse winds, it is not always easy to hold the lighter precisely in the center. It is anticipated that lighterage service on the river will develop greatly. As a means of promoting such development, bridges hereafter built should have straight bottom chords instead of arched chords in order that full

head room may be given lighters and tugs for the entire width of the bridge, and the opening of the bridges be avoided.

A city ordinance requires bridges to be closed to boats during specified hours[1] in the morning and evening. The navigation interests find these long periods of closed bridges a great inconvenience. They contend that the bridge hours might be modified in their interest and to their very great benefit, or abolished altogether, without inflicting as much inconvenience upon the bridge-using public as is popularly supposed. Owing to the increase in the size of vessels, which means that the same tonnage is handled by fewer vessels than formerly, and owing to the increased facility with which bridges are opened, as compared with former days, it is argued that vessel movement through the bridges constitutes a smaller impediment to pedestrian, team and street car traffic than was the case a few years ago. The passenger boat interests are particularly insistent that the bridge hours should be modified in their favor. They argue that passengers upon boats should have the same rights to pass through the bridges that pedestrians have to pass over them. Their wants would be satisfied if bridge hours should be done away with from the mouth of the harbor as far as Wells street, as only one passenger boat regularly goes above Wells street and that one, doubtless, could make arrangements to land its passengers east of Wells street if it could get that far. With a wider and straighter river, vessels may pass in opposite directions through the bridges, thus diminishing the bridge nuisance. When piers shall be constructed north of the mouth of the river, as recommended by the Commission, passenger boats will come into the river less and thus the bridge nuisance will be still further diminished. The Harbor Commission has not gone into this matter with suffi-

[1]The closed hours for bridges on the main river, on the south branch to Twelfth street and on the north branch to Kinzie street, are from 6:30 to 8:30 in the morning and from 5 to 7 o'clock in the evening. The closed hours on the south branch beyond Twelfth street to and including Halsted street are from 6 to 7 o'clock in the morning and from 5:30 to 6:30 in the evening. The closing hours are the same on the north branch beyond Kinzie street to and including North Halsted street. All other bridges are required to be closed between the hours of 6 and 7 o'clock in the morning and 6 and 7 o'clock in the evening. Bridge closing hours do not apply on Sunday.

cient thoroughness to warrant a definite recommendation in reference to the modification or abolition of bridge nours in the interest of the freight carriers. It commends the further consideration of that subject to the Council Committee on Harbors, Wharves and Bridges, and suggests the desirability of giving hearings on that specific point to all the interests affected.

The Commission does favor granting the request of the passenger boat managers and recommends that the ordinance relating to bridge hours be so modified as to allow passenger boats to pass through bridges between the mouth of the river and Wells street at any time.

### Current in the River.

The swiftness of the current in the main river and the South Branch constitutes another obstacle to navigation. The liability of damage, both to the vessel and the bridge structures on account of the current and the narrowness of the stream, also leads vessel men to prefer other harbors to the Chicago River. The necessity of employing tugs to assist in navigating the Chicago River is another serious burden. Primarily, on account of the current, it is customary, as already stated, for boat managers to charge 10 cents more for bringing coal from Lake Erie ports to points on the South Branch of the Chicago River than to nearby harbors. While the rate for taking grain out of the Chicago River is not always higher than from other harbors, it is true that vessels prefer to go to other points for their grain cargoes if they can secure them on as advantageous terms as in the Chicago River.

There is, perhaps, no subject in connection with the harbor facilities on the Chicago River that is of greater importance than the current. Vesselmen, who have testified before the Commission, have all dwelt on its importance, and the seriousness of the subject is illustrated in a practical way in the higher rates charged for handling commodities on the South Branch, as already referred to. The Government restriction in respect to the current is that it shall not exceed one and one-quarter miles per hour. This would not be a very serious matter in a straight and open stream, but when taken in connection

with the narrowness of the river, the frequency of the bridges, it is of great importance and some steps to mitigate this current should be taken, especially in that portion of the river between Lake street and Twenty-first street. In the main stem, between the mouth of the river and Lake street, the rate of flow will be diminished by the operation of the North Shore Canal; that is to say, the in-take of lake water through this canal, sometimes known as the "Wilmette Channel." But this new in-take for water will not help the situation in the South Branch of the river, and for that reason the Harbor Commission considers that some thing should be done to diminish the rapidity of the current in the river between Lake street and Twenty-first street.

NOTE: Commissioner Randolph demurs to the foregoing statement for the following reasons: The work of improving the Chicago River is incomplete and it is his belief that when the plans for its improvement are consummated, there will exist no cause for complaint on account of the current.

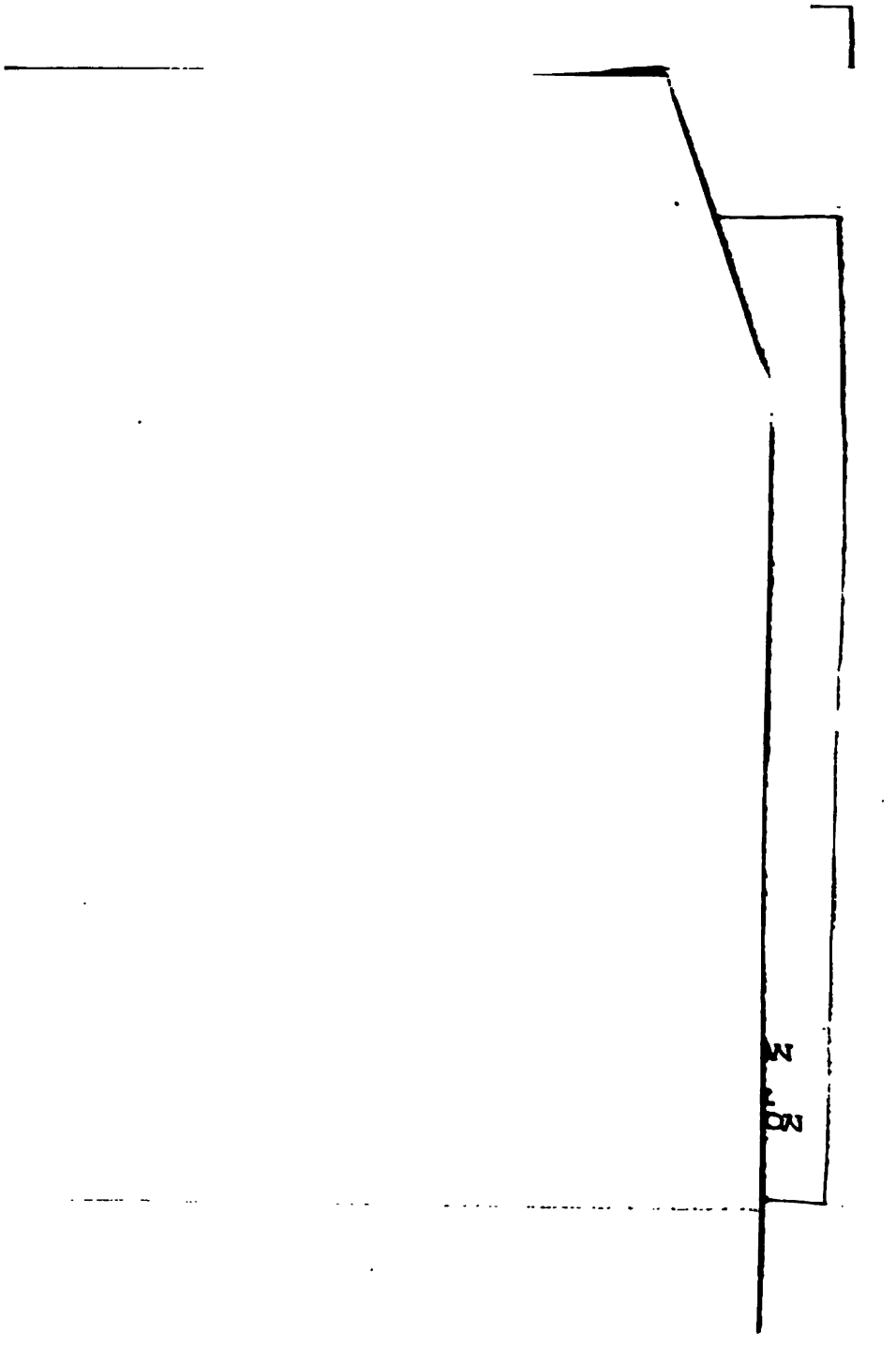
## DOCK AND WAREHOUSE FACILITIES.

Both the dock[1] and the warehouse facilities in the Chicago River are inadequate. New vessel lines find it difficult to secure dock space at all, and existing lines find it difficult, if not impossible, to extend their present facilities in order to satisfy the growing needs of their business. In proportion to the traffic handled, the warehouse facilities are more meager in Chicago than in other principal lake ports. The specific figures and comparisons on this point may be found in the paper of Mr. W. H. Johnson of the "Anchor Line," read before the Commission, and published in the appendix, page 351.

The city is in need of public docks for the distribution at convenient points of freight which can be readily handled by lighters. A number of such city docks should be established. In some cases the stub ends of streets abutting on the river (streets without bridges) might answer the purpose at very moderate expense.

[1]There is opportunity for dock development with good facilities on the South Branch of the Chicago River west of Robey Street. For a mile along the River and Sanitary Canal the property is cheap and well adapted to this development.

his development.



## Recommendations in Regard to the River.

In view of what has been said, the Commission believes the center-pier bridges on the main river and the South Branch should be removed as speedily as possible and structures offering less obstruction to navigation built in their place. The cost of this work has been estimated at, approximately, $3,000,000. The need for the removal of the center piers at Rush and Lake streets is particularly urgent.

The Harbor Commission believes that the navigation of the main river and the South Branch demands:

(*a*) That the main river should be widened to 250 feet.

(*b*) Cutting off the elbow at Rush street on the south side of the river, as indicated on accompanying diagram (1).

(*c*) Cutting off the projecting elbow south of the Chicago and Northwestern Railway bridge at the northeast angle of the main forks, and making a turning basin at the present forks of the river, as indicated on accompanying diagram (2).

(*d*) Straightening the river from Twelfth to Sixteenth streets, as indicated on accompanying diagram (3).

(*e*) That all center-pier bridges be replaced by modern bascule bridges without abutments extending into the river.

The Commission has been unable to do the engineering work necessary for the preparation of detailed plans and estimates of cost. This work should be carried out by the engineering experts whose appointment is recommended in this report and immediate action in this direction is urged.

The Commission recommends that a survey of the dock lines on the main river and the South and North Branches be made and that all rights of ownership be determined. Similar surveys should be made for the Lake Front and the Calumet region.

The Commission recommends that the river be electrically lighted for navigation at night.

This Commission is unable to present a detailed plan for the improvement of the North Branch. The need for improvement in the interest of navigation is, however, urgent. Attention is particularly called to the following:

(*a*) The need of straightening the channel at some points, especially between Clybourn and Bloomingdale ave-

nues, at North avenue, and between Webster avenue and the crossing of the Milwaukee division of the Chicago and Northwestern Railroad.

(*b*) That the widening to 200 feet of the North Branch be accomplished as far as it can be done in a practical and economical manner.

(*c*) That all center-pier bridges be replaced by modern bascule bridges without abutments extending into the river.

(*d*) That the necessary dredging be done to enable boats to reach the docks.

(*e*) That unsatisfactory conditions at Fullerton avenue, caused by a sewer opening and insufficient dredging, be immediately remedied.

(*f*) That the turning basin just south of Diversey boulevard, particularly the eastern part thereof, be dredged to a sufficient depth to make it navigable.

(*g*) That a careful investigation be made as to the feasibility of deepening and widening the channel now being built by the Sanitary District and known as the North Shore Canal (Wilmette cut-off), so as to make it navigable with a view of relieving congestion in the main channel of the river, saving distance and time and opening up a new district for manufacturing and dock purposes.

(*h*) The Commission further recommends that provision be made for a technical engineering study for the purpose of outlining a detailed plan for the progressive improvement of the North Branch of the river.

These recommendations in regard to the Chicago River represent in the aggregate the expenditure of a good deal of money; but the sum bears a small ratio to the value of the commerce involved (see page 17, $260,000,000 annually) or to the value of the improvements, public and private, already made and existing in and along the river —which represents the "value of the plant"—our river harbor facilities.

### Section 4. Sanitary and Ship Canal.

The Sanitary and Ship Canal is a navigable channel 22 feet in depth and varying from 160 to 202 feet in width, extending from Robey street in the City of Chicago, where it connects with the South Branch of the Chicago River, to

the Desplaines River at Lockport, Illinois. The artificial channel extending from Robey street to the power plant at Lockport is thirty miles long. The drop at this point varies betwen a maximum of forty feet and a minimum of thirty-four feet. The Sanitary District, in compliance with the state law, has here built a lock 22 feet wide, 130 feet long and having a depth of 12 feet over the miter sill. Beside this lock a site is reserved for a deep waterway lock 80 feet wide and 900 feet long. Below the lock the channel, for more than a mile, is 160 feet wide and 20 feet deep.

The prime object in the construction of the Sanitary and Ship Canal was sanitation, but the promotion of navigation, and especially the facilitating of the Lakes-to-the-Gulf waterway movement, was an important incidental motive leading to the construction of this canal. The total expenditures of the Sanitary District from its organization to December 31, 1907, are $56,616,014.44, this amount including construction, river improvement, power plant and administration.

While the Sanitary District Board has expended over ten million dollars in river improvement, which has redounded to the benefit of navigation, such work was not undertaken by the District primarily with a view to promoting navigation. The Sanitary District Board can lawfully spend money for sanitary purposes only and such work of river improvement and removal of center-pier bridges as it has carried on has been prosecuted with a view to securing the flow of water necessary for sanitary purposes. The Sanitary District cannot lawfully undertake improvements solely in the interest of navigation. If such improvements in addition to those which the federal government may properly be asked to make, are to be carried through, the City of Chicago must be given the financial ability to do the work or some other agency must be authorized by the legislature to promote the navigation interests of the community.

The Sanitary District owns a strip of dockage on each side of its canal. It is the policy of the Board to promote the development of this territory for industrial uses and to that end leases of dock land are made on favorable terms to concerns desiring to locate along the canal. The

Sanitary District Board has developed water power at Lockport to produce electricity, which it is selling to municipalities and to manufacturing concerns.

The Sanitary and Ship Canal is intended to form a link in the Lakes-to-the-Gulf waterway. When that waterway is completed the question of a satisfactory outlet to Lake Michigan will become important. Unless some other channel is provided, the Chicago River will constitute that outlet. That the Chicago River does not constitute as satisfactory an outlet for a waterway of the contemplated magnitude of the Lakes-to-the-Gulf, is obvious, and the Harbor Commission has listened to various projects for creating a new outlet which shall be straighter and wider than the existing river. In order not to take up a great space in the body of this report with some of the suggestions submitted, a special article, prepared by one of the Commission, giving a digest of these suggestions, appears on page 245 of this volume. Of course, the real difficulty in carrying out any of these projects is that it involves a much larger expenditure of money than the city alone would be warranted in undertaking. If, however, the Lakes-to-the-Gulf waterway is seriously meant as a national enterprise, then the main entrance to it at the lake end should be adequate, and the state and federal governments should join with the city in making it so.

### Section 5. The Lake Front.

A movement for harbor development on the lake front was inaugurated about forty years ago. In furtherance of that movement the United States Government actually built a breakwater designed to afford protection for an outer harbor. The realization of plans for this development was largely interfered with by the prolonged litigation between public authorities and the Illinois Central Railroad. A bill authorizing the City of Chicago to develop a lake front harbor, was offered in the legislative session of 1869. This bill was amended so as to authorize the Illinois Central, instead of the City of Chicago, to control the proposed harbor development, and in this form the bill was passed. Owing to public opposition, the law was repealed by the legislature of 1873, but the Illinois Central Railroad contended that the act of 1869 was a contract and hence was

not subject to repeal. The United States Army Engineer, in his report for 1870 recommended the development of an outer harbor adjoining the mouth of the Chicago River. Congress later made appropriations in furtherance of this recommendation and the protecting breakwater was constructed. This litigation was not concluded until 1892, when the United States Supreme Court gave a decision adverse in the main to the claims of the Illinois Central Railroad Company and holding the repealing act of 1873 to be valid. In 1895 the city council passed an ordinance embodying a contract with the Illinois Central Railroad, under which disputed property rights were settled and the area comprising the present Grant Park was dedicated to park purposes and turned over to the Board of South Park Commissioners.

The Lake Front between Grant Park and Fiftieth street is occupied and largely owned by the Illinois Central Railroad Company, which acquired the right from the City of Chicago by an ordinance passed June 7, 1852:

> "To lay down, construct and maintain within the limits of the City of Chicago and along the margin of the lake within and adjacent to the same, a railroad with one or more tracks, and operate the same with locomotives, engines and cars. * * * Said road to enter said city at or near the intersection of its southern boundary with Lake Michigan, and following the shore on or near the margin of said lake northerly to the southern bounds of the open space known as Lake Park. * * *"

The feeling of the public authorities of the City of Chicago at that early date with regard to the establishment of an "outside harbor" south of Park Row at some time in the future, and the necessity (or at least wisdom) of securing to the people access thereto for all time is shown in the sixth section of this ordinance containing the following express reservation:

> "And, provided, also, that in case of the construction of an outside harbor, streets may be laid out approaching the same, in manner prescribed by law, in which case the common council may regulate the speed of locomotives and trains across the same."

**The extent of Chicago's future water commerce cannot be foretold with precision. The city certainly needs more extensive water terminal accommodations than it now enjoys. These additional accommodations may be supplied in part by improvement of the Chicago and Calumet Rivers and Calumet Lake. The portion of the lake front from the mouth of the Chicago River to Chicago Avenue should be reserved for possible future harbor uses and the construction in that area of piers for the accommodation of passenger and package freight and fruit lines should be undertaken by the city, as speedily as possible. Such piers will afford much relief to the water shipping situation and their use will throw light on the question of the need and desirability for lake front harbor development south of Grant Park.**

In making this recommendation the Commission is not unmindful of and desires to call special attention to the fact that the Chicago Dock & Canal Company, a corporation organized under a special act of the Legislature, approved February 12, 1857, claims the right under the powers granted in its charter to construct and maintain docks, wharves, piers and landing places in Kinzie's Addition to Chicago, extending from the mouth of the River to Chicago Avenue, and in the waters of Lake Michigan adjacent thereto. The charter of this company gives it the power to own real estate not exceeding in all fifty acres, and also provides among other things:

> "Said company shall have the power to inclose, make and protect, and also to erect and construct, on their own lands and on the shore and in the navigable waters of Lake Michigan (so that they do not in any manner obstruct or prevent the free navigation of the same, in front of their own lands and premises, and in front of the premises of such person or persons as may assent to the same), wharves, docks, moles, piers, breakwaters and such other erections, protections, improvements and conveniences for the safety and accommodation of boats and vessels, and the security and advantageous use of their own property, wharves and docks, or for the purposes of convenience in the use and enjoyment of said property by the said company, as the board of directors of said company may deem necessary and proper.
>
> "Said company shall also have power to excavate, maintain, preserve and keep open canals, basins, slips, and such other ways, with their embankments, supporters and appurtenances, for the entrance of boats and vessels of all kinds from the lake, and also from the Chicago harbor and river; to levee part of their property, lands and premises as may, by the board of directors of said company, be considered necessary and convenient for the profitable use and enjoyment of said property, and for the interests of said company."

If the charter power of this company has been actually exercised and any docks have been actually constructed by it we believe that the city, by proper enabling legislation, could condemn such docks and any other property or rights of the Company for the purpose of harbor construction and improvement. Any rights or privileges claimed by the company by virtue of its charter power to erect and maintain docks in or upon the submerged lands of Lake Michigan which have not as yet been exercised could be revoked by the Legislature.

Nor could this company in the future exercise its charter right to construct

docks or piers in the waters of Lake Michigan without the consent of the Federal Government (Section 10, Act March 3, 1899).

There are several other companies incorporated by special acts of the Legislature, with powers similar to those of the Chicago Dock & Canal Company. These companies are operating in other parts of the city. Whatever property and rights they have can be acquired and controlled, we believe, in the same way as the property and rights of the Chicago Dock & Canal Company.

While it is practicable and desirable to develop dockage on the Lake Front north of the Chicago River, and if necessary from there to Chicago Avenue, it is of the utmost importance that these docks should be served by railway tracks on terms that shall be both equitable and uniform to all railways entering the city.

Furthermore, that part of the lake front from the mouth of the Chicago River to Randolph street, which is the beginning of Grant Park should also be devoted to harbor uses.

The question now presented to the community is whether the lake front, from Grant Park to Jackson Park, shall be permanently dedicated to park purposes, to the entire exclusion of harbor developments in aid of navigation.

While the Harbor Commission is not prepared to make an affirmative recommendation as to the extent and nature of any possible harbor development in the area between Grant Park and Jackson Park, it does believe most strongly that no park development should be favored which will forever prevent the possibility of utilizing a portion of this area later for harbor purposes.

The Harbor Commission appreciates the value of the Lake Front for park development. It does not desire to stand in the way of the speedy realization of such plans; but, on the contrary, strongly favors their accomplishment at the earliest possible moment. There is no real conflict between the harbor and the park interests of Chicago and no artificial or unnecessary discord should be permitted to retard the complete and prompt execution of the plans necessary for the development of both sides of the city's life.

There are several ways by which the park improvement might proceed and not interfere with a possible harbor development later on, should such development be found a necessity.

One would be to build a massive pier straight out into the lake, say at Sixteenth street, having railroad track and

street traffic connections, and from which pier a series of docks could be projected. The trunk lines at Sixteenth and Forty-first streets might be connected in the same way as indicated in the next following paragraph. Similar piers are now being constructed in New York Harbor.

Another would be to develop the parkway so that it would itself form a breakwater, leaving a navigable lagoon or harbor of considerable width between the parkway and the present shore line. A lagoon 1,800 feet in width, for instance, might admit of a harbor with docks projected at an angle from the shore, as well as a reservation of a right of way, say 100 feet in width, outside of the Illinois Central road, or a width ample for railroad purposes to connect the trunk lines at Sixteenth street and Forty-first street.

It is recognized by the Commission that that plan should be worked out which will least hinder all desirable park development. This requires more expert and detailed information than the Harbor Commission is able to supply, hence its recommendation that this be referred for further expert study. The Commission suggests that a detailed plan carrying out this idea should be worked out jointly by the experts of the park authorities and an expert engineer appointed by the the city, subject to the approval of the City Council and the South Park Commissioners. The Commission urges immediate action by these authorities.

The developments of water commerce and the adequacy of the other provisions which can be made for accommodating commerce should determine in the future the question as to whether or not lake front harbor development south of Grant Park will be needed. Changes now taking place in the character of the neighborhood abutting the lake front in that region will probably point to a proper solution of the question.

In consideration of this entire question your Commission is not unmindful of the fact that harbor facilities on the Lake Front will cause pollution of our lake water which we have been spending millions to purify, besides increasing the smoke nuisance.

It has been pointed out by advocates of lake front harbor development that at Sixteenth street seventeen trunk lines

are located within a mile of the lake front. Connections between these railroads and the lake front could be secured by possible subway development or by the existing overhead rail lines running to the lake front at Sixteenth and Forty-first streets, which lines could be widened, if necessary, to afford adequate track accommodations.

It has also been suggested to the Commission that utilization of the lake front for navigation purposes would not impose upon the public the necessity of condemning the rights of riparian owners or compensating them, either by money payments or by cessions of land. Even if compensation to riparian owners may be necessary in order to utilize the lake front for park purposes it does not follow that like payments will be necessary as a prerequisite to harbor development.[1]

## The Illinois and Michigan Canal, and Its Relation to Harbor Development.

The Illinois and Michigan Canal was once a force for good in the upbuilding of Chicago, before the march of progress dwarfed its capabilities and it was outstripped by the railways. When no longer a highway of commerce, because it had been outgrown, it entered upon a career of usefulness as the outlet for a vast amount of Chicago's vilest sewage, which was lifted into it by the city sewage pumps at Bridgeport, and just to the extent of that pumping was the water supply preserved from pollution. But that was an alleviation only, and not a cure. The Sanitary Canal was built and thereafter the old canal, from Chicago to Joliet, lost its usefulness. But another career is open to

[1]In this connection the Commission, after investigation, deems it a duty to state that it is of the opinion that the contention made before this Commission October 13, 1908, that any recommendation for harbor reservations on the Lake Front south of Twelfth street would add one hundred million dollars of value to the riparian rights of the Illinois Central Railroad Company, for which the South Park authorities would have to compensate the Company if the park development authorized by the legislative enactment of 1907 were carried out, *is without foundation and wholly untenable.* Whatever the rights of the Illinois Central Railroad Company may be as the riparian owner of that part of the Lake Front in question, such rights are wholly subservient to the superior rights of the State of Illinois, which holds the fee to the submerged lands from the water's edge in trust for such uses as may be deemed necessary in aid of navigation and subject also to the final authority of the Federal Government.

it. The cost of railroad terminals in our great cities has become so great that it is a check upon railroad building, and cities suffer the loss of multiplied means of communication because their gates are shut against newcomers in the family of railroads.

The Illinois and Michigan Canal should be the highway along which new railways may enter Chicago upon living terms, and over which existing railways may interchange business economically. The right of way of this canal is 240 feet wide (28.8 acres to the mile) and four and one-third miles are within the city limits. This stretch at least should belong to the City of Chicago. The property right in it should be secured from the general government and the state should vest its right thereto in the city. This is equity. The canal was built for commerce, commerce has deserted it and by its side is a channel which in depth and width meets the needs of the great freight carriers of our modern times. This new channel has been provided by Chicago free of any expense to government of nation or state, and whatever salvage there may be in the old canal should be given to the people who have paid for the new. This canal right of way is crossed by belt and trunk lines and is paralleled by trunk lines. The lines which cross it are so high above its surface that a seventeen-foot head room may be secured. This right of way will accommodate eighteen lines of track laid thirteen feet apart, center to center. It terminates at the west fork of the South Branch near the intersection of Ashland Avenue and Twenty-ninth Street. It might be connected with the harbor on the Lake Front, over a route which traverses property to-day of little value and sparsely settled. This route would extend from the canal right of way southeasterly to a junction with the Stock Yards line, which it could follow on a contiguous right of way to the Lake Front, and enter a harbor reservation at or about Fortieth Street.

## Section 6. Calumet River and Harbor and Adjacent Ports.

Originally the Calumet River made a sharp turn to the south as it came toward the lake and ran parallel with the shore for a considerable distance before reaching the lake. It was separated from the lake by a long, narrow sand spit, on which there was a depth of two to three feet of water. The channel in the river was about seven feet in depth. In 1870 the United States Government cut through the sand spit at the point where the river turned to the south, and protected the banks of this cut by pile pier revetments, and dredged the channel to a depth of fifteen feet. In 1904 a breakwater, about 6,900 feet long, covering the mouth of the Calumet River, was constructed by the government and the area sheltered by the breakwater dredged to a depth of 22.7 feet. There are now also two piers at the mouth of the Calumet River, the south pier projecting about 2,250 feet and the north pier about 1,100. The harbor entrance is 300 feet wide.

Six miles up, the river forks, and there is a connection with Lake Calumet through a narrow channel about 1,100 feet in length, and varying in depth from four to six feet. One and sixty-five hundredths miles above the "Forks," or 7.83 miles from the end of the north pier is the Junction or head of the main Calumet River, where it divides into the Little Calumet and the Grand Calumet. The Grand Calumet is a lagoon or bayou (about eighteen miles long, with a channel of from five to ten feet deep and about fifty feet wide), with banks rising just above the water surface and has no current except that which is caused by floods and freshets or by fluctuations in Lake Michigan. The city of Hammond, Indiana, is situated on the Grand Calumet 2.75 miles above the junction. The Little Calumet is sixty miles long, with an average depth of about eight feet and a width of a little less than 200 feet from the junction seven miles up to the village of Blue Island.

The present project for improvement contemplates a channel of 200 feet width and 21.7 feet draft at the main lake level for 4.92 miles from the east end of the north pier. Thence similar width and 17.7 feet draft for 1.26 miles to the Forks; and thence ultimately 200 feet width,

with possibly 11.7 feet draft for 4.87 miles farther up the Grand Calumet to a point one-half mile above Hammond; also five turning basins of not less than 650 feet diameter.

The present condition of the channel is as follows: From its mouth to One Hundred and Sixth street, 22.7 feet depth, with 300 feet width between the harbor piers, decreasing gradually to 200 feet width near Ninety-second street, and retaining this 200 feet width to One Hundred and Sixth street, except through the three railway bridges near Ninety-ninth street, where the channel has a practically uniform width of 85 feet; from One Hundred and Sixth street to One Hundred and Eleventh street, 21.7 feet depth and 200 feet width; however, shoaling to the extent of one or two feet, especially at the sides of the channel, has taken place between the mouth and One Hundred and Eleventh street; from One Hundred and Eleventh street to One Hundred and Fourteenth street (the rock section), 22.7 feet depth, with a bottom width of 180 feet; and thence to the Western Indiana railway bridge (work done in September), same bottom width, 17.8 feet depth; thence to Hammond (via the Grand Calumet), the depth varying from five to eight feet and width from fifty to sixty feet.

Crossing the Calumet River and its branches are eighteen bridges, owned and maintained by the City of Chicago, of which six permit the passage of boats. There are also twenty-six railroad draw bridges across the Calumet River and tributaries.

Six and one-half miles farther south of the Calumet harbor lies the private harbor called Indiana Harbor. This consists of two projecting piers, the north pier 1,800 feet in length and the south pier 1,140 feet in length. The distance between the piers is 300 feet and the depth of the water twenty feet. There is also a channel running 6,000 feet in a southwesterly direction, 200 feet in width and 20 feet in depth, and containing a turning basin 400 by 600 feet. It is intended to carry this inland harbor 1,200 feet farther.

Twelve and three-quarter miles southeast of Calumet lies the private harbor of Gary, constructed by the United States Steel Corporation. This will be an artificial harbor formed by piers 250 feet apart and extending into the lake a distance of 2,000 feet, with 25 feet depth of water. The

harbor will also be extended inland 3,160 feet in order that it may be immediately in contact with the extensive iron and steel works located there.

The commerce of Calumet Harbor has increased rapidly in the last twenty years, as is shown by the following table:

| | RECEIPTS AND SHIPMENTS. (Net tons.) |
|---|---|
| 1889 | 735,599 |
| 1895 | 2,879,605 |
| 1900 | 3,783,674 |
| 1905 | 4,530,394 |
| 1907 | 6,430,347 |

The bulk of this increase has been iron ore for the use of the steel works at South Chicago. In 1897 the commerce in this commodity amounted to 1,734,086 tons, and in 1907 to 4,717,426 tons. Aside from the development of traffic in iron ore, there has been very little expansion of water shipment in the Calumet Harbor.

The development of the South Chicago region has been one of the conspicuous features in the recent growth of Chicago. The establishment of great industries at Gary, Whiting, Indiana Harbor, Hammond and South Chicago is proceeding at a phenomenal rate, and will eventually make this region an important rival of Pittsburg in the production of iron and steel manufactures. Although not all of this area is included within the corporate limits of Chicago, this section should be regarded as a part of the great industrial community of Chicago. In the main, the growth and prosperity of this region will accelerate the growth and prosperity of all Chicago. The harbor of South Chicago, in particular, should therefore be improved on some systematic plan as rapidly as possible. This development should not be carried on, however, at the expense of already established centers in other quarters of the city, nor with the design of making the Calumet our only important harbor. A sound policy of preserving and extending our water terminals and commerce requires the improvement both of the Chicago and Calumet Rivers and harbors, and there is room and need for development of both in the interest of the whole community. Indeed, as already explained, they have different functions to perform.

It is of great importance that in the development of the Calumet and its tributaries, the difficulties now encountered on the Chicago River should be avoided wherever possible. There should be no such delay in widening and straightening channels, as on the Chicago River, until land values and business damages become prohibitive. Bridges with narrow spans, abutments and center piers should be avoided wherever possible in the light of the experience with navigation on the Chicago River. Present bridges having insufficient openings should be replaced with bridges giving ample waterway. All new bridges should provide for a clear waterway of not less than 200 feet or two openings of 100 feet or more. The number of bridges, already reaching the alarming total of forty-four, should be kept as low as consistent with the demands of traffic. Public docks should be provided, or, at least, frontage reservations should be made now, so that public docks can be constructed if required in the future. Already the river front is largely occupied by railroads, and in a few years, if precautions are not taken, dock facilities cannot be secured. It cannot be too strongly urged that unless the City of Chicago takes a firm grasp of this situation, the growth of population and industry around the Calumet will bring a repetition of every one of the unfortunate conditions that are now found on the Chicago River. The situation will render difficult its use either as a harbor or as a highway, and will make even moderate improvements exceedingly expensive. The Harbor Commission recommends that detailed surveys, plans and specifications be made with a view of widening the Calumet to 300 feet as far as the Forks and to still greater width on the bends. The contemplated improvement from the Forks to Hammond will afford a width of 200 feet, and, when these improvements are carried out, the Calumet River will be in a position to become a useful part of Chicago's terminal facilities. One advantage of a 300-foot river is that it will discourage putting bridges at unimportant streets or highways.

A plan to transform Lake Calumet into a land-locked harbor was presented to the Commission by Mr. Murry Nel son, Jr., President of the Calumet and Chicago Canal and Dock Company (see map). This project contemplates cut-

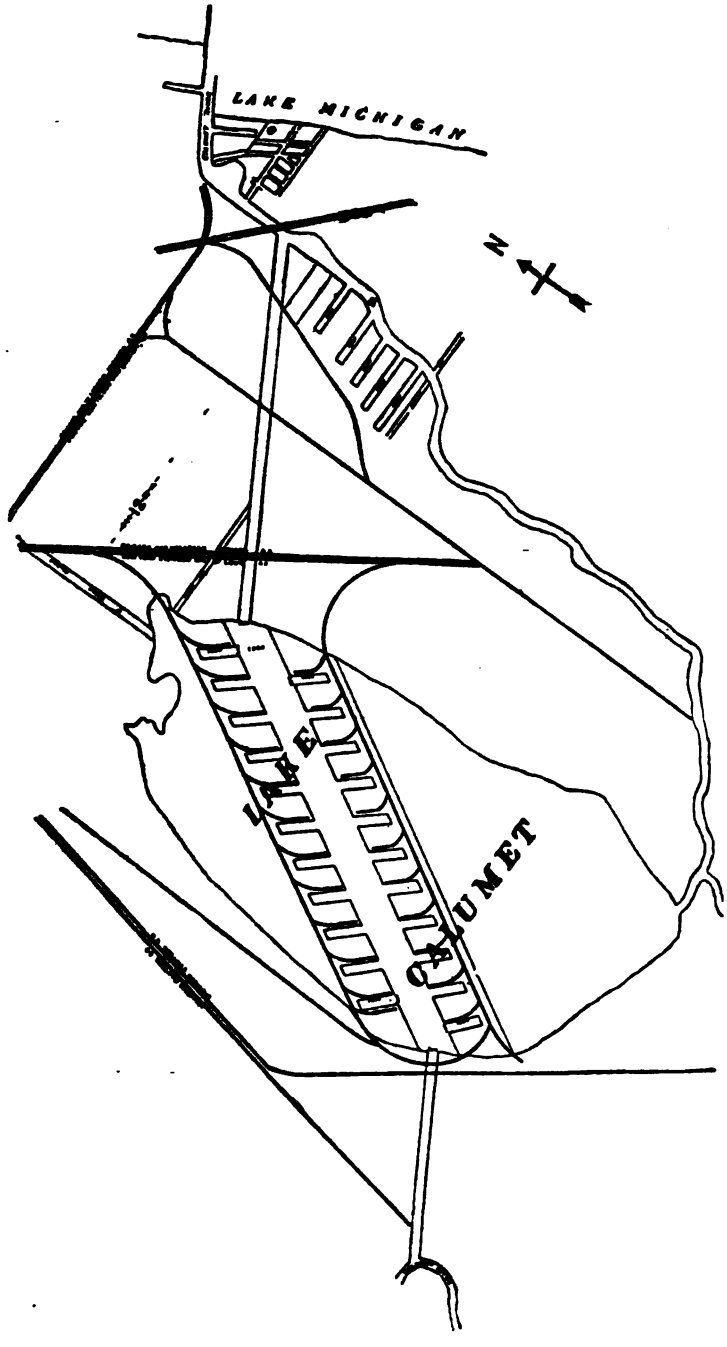



Diagram showing proposed development of Lake Calumet for harbor purposes.

ting a channel 300 feet wide from the Calumet River to the north end of Calumet Lake; then dredging the channel 1,000 feet wide, more or less, from the northeast to the southwest corner and filling in the remainder of the lake with the spoil from this excavation. Slips and docks might then be constructed on each side of the channel and advantageous railroad connections made. The advocates of this plan point out a further advantage of such a location for a harbor if a supplementary connection of the lake with the Sanitary and Ship Canal by way of the proposed Sag cut-off is carried through. This plan certainly offers the prospect of an excellent harbor at a relatively low cost, and should be carried out in such manner as seems most desirable after further technical study.[1]

## Section 7. Harbor Administration and Finance.

Chicago's harbor development has suffered severely because of division of authority and responsibility. The federal authorities have rendered good service and have been active in the prevention of obstacles to navigation, and have appropriated money for dredging purposes, turning basins and breakwaters. Their attitude has been properly a negative one, and they have not undertaken to formulate a comprehensive plan for harbor improvements. The Sanitary District has improved the Chicago River by widening, straightening and deepening its channel and by constructing bridges of an improved type wherever

[1]Reference is here made specifically to the plan suggested by Mr. Murry Nelson, Jr., although others have advocated the development of Calumet Lake as an inland harbor. He indicates a method which could be adopted to advantage, by which the material excavated from the harbor and slips would be used for making land for wharves and warehouse sites. Mr. Nelson stated that he would recommend to his company that it donate the right of way for a wide and straight canal from the Calumet River to the northern end of Calumet Lake. When asked how this harbor work could be done, he suggested two ways. Either the state, directly through its agent, the City of Chicago, might dig the harbor, build the docks and control the entire enterprise. The value of the land reclaimed by filling in the lake would cover the cost of this undertaking. Or, since the harbor to be created would not be a "city" or a "commercial" harbor, but would be an "industrial" harbor, having much cheap land about available for manufacturing purposes, he suggested that it might be better to contract with the shore owners of Calumet Lake (some seven or eight in number) to establish a dock line in the manner suggested and make the necessary improvements, compensating themselves for the cost of the work by the enhanced value of the land made by the excavated material in forming the channel and slips.

bridges were necessitated by changes in the channel, but all of this work has been incidental to securing such a flow of water as would provide the degree of sewage dilution required by the law. The City of Chicago has also shared in the work of harbor development, but, partly because of lack of funds and partly because of lack of proper administrative organization, has never been in a position to formulate or execute a comprehensive and progressive policy regarding its harbor. The Commission finds that the present method of harbor administration is not conducive to the attainment of the best results. There are a number of officers of various kinds engaged in harbor work, including a harbor master, a vessel dispatcher, a harbor engineer, a bridge engineer, the harbor police, the dredge inspectors and the bridge tenders. But these officers are not properly correlated, nor are they placed under any responsible supervision. The fundamental difficulty is that there is no official who can be considered responsible for the very important work of harbor supervision and administration in the City of Chicago. Our harbor administration is defective in that it lacks the essential business requirement of a responsible head. The Commission recommends, therefore, the establishment of a new department of the city government to be known as the Harbor Department. This department should correspond in status to the police, fire, health and other co-ordinate branches of the city administration and should be made responsible for the supervision of dock and harbor matters and for the protection of shipping interests in the port of Chicago, including both the Chicago and Calumet Harbors. The head of this department should be a commissioner appointed by the mayor, subject to confirmation by the city council. The harbor master, harbor engineer, vessel dispatcher, harbor police, dredge inspectors and bridge tenders should be placed under his supervision and control and the responsibility for harbor administration should be clearly and definitely placed upon him.

In furtherance of the general plan already outlined, it is desirable that the council should authorize the appointment of a thoroughly competent engineer to make the surveys herein recommended and to prepare detailed plans, specifications and estimates of cost of the suggested harbor im-

provements. This work could not be carried on by this Commission and was not attempted, but it should be undertaken at the earliest possible moment, as the completion of comprehensive harbor improvements will require several years even under the most favorable circumstances.

The Commission also recommends that an advisory board be organized to co-operate with the engineer. This board might be made up of seven persons selected as follows: Three persons appointed by the mayor; the chairman of the Council Committee on Harbors, Wharves and Bridges; a representative of the United States Government to be designated by the Secretary of War (presumably the resident United States Engineer, representing the War Department); a representative of the State of Illinois designated by the governor, and a representative of the Sanitary District designated by the trustees of the district. The plans of the engineer for harbor improvement should be submitted to the advisory board for its consideration and approval. Naturally, responsibility for any policy would rest finally upon the city council of Chicago. The engineer and the advisory board would undertake only new harbor improvements and consider broad questions of public policy relating to them, and would not interfere with the administrative duties of the head of the Harbor Department.

The City of Chicago now possesses power "to construct and keep in repair bridges, viaducts and tunnels and to regulate the use thereof;" "to deepen, widen, dock, cover, wall, alter or change channel of water courses; to construct and keep in repair canals and slips for the accommodation of commerce, to erect and keep in repair public landing places, wharves, docks and levees; to regulate and control the use of public and private landing places, wharves, docks and levees." (See Cities and Villages Act, R. S. Ill., Chap. 24, Art. V, Sec. ; 28, 30, 31, 32, 33, 34, 35, 36, 37, 38 and 39.)

The bills proposed by the City Charter Convention give a broader grant of power: "The city shall have power to acquire, construct, maintain and operate or lease for operation, wharves, docks and levees and in connection therewith, elevators, warehouses and vaults." In addition to this, the city should possess the further power to acquire, operate or lease tracks and terminal facilities in connection

with docks. The city should also have the power to condemn such land as may be necessary for or in connection with the creation of harbor or docks. In the absence of such authority the city will be unable to construct a harbor such as the needs of commerce and navigation require. Furthermore, if Calumet Lake is to be transformed into a harbor, the city should seek from the State of Illinois a grant of the fee of the bed of this lake, or such other rights as may be necessary to carry out the improvement.

In so far as the work of developing dock and related facilities shall be undertaken by the City of Chicago as a public enterprise, the expense should be met by the issue of city bonds. It is argued, however, that bonds issued for the construction of city docks from which considerable revenue may be derived are not, properly speaking, an obligation of the city, but in reality a profit-producing investment, and that such bonds should not be counted in computing the debt limit of the city. The Commission, therefore, suggests that it may be desirable to amend the constitution of Illinois so as to exclude bonds issued for revenue producing purposes from the city debt limit and exempt such bonds from taxation. Any such amendment should be safe-guarded so as to prevent abuse. Under the New York constitutional amendment now pending, such bonds are not exempted from computation until the revenue-producing character of the enterprise has been actually demonstrated to the satisfaction of a judicial tribunal.

The Harbor Commission has considered the suggestion that in making river improvements materially benefiting abutting or adjoining property, the principle of special assessments should be applied and some portion of the expense incurred be borne by those directly benefited by the improvement. Unless this is done, the city is likely to find itself in a situation where it pays a high price to condemn land for an improvement which immediately increases the value of adjacent property. Some application of this principle is suggested by the Commission as desirable if a comprehensive policy of river improvement is to be pursued.

The same result might be reached if the city possessed power to condemn more land in making an improvement

than is absolutely necessary for the immediate purpose of the improvement. If, for example, the city might condemn not merely the land necessary for widening or straightening the river channel, but an additional strip of land that would probably be greatly enhanced in value by the improvement, the property increased in value by the city's improvement might then be sold under such restrictions as the city might find necessary or desirable and the proceeds applied to the payment of the cost of the public work in question. This power is commonly granted to European cities, and makes it possible for them to pay in this way in whole or in part the expense of many public improvements. Similar rights have been granted to the cities of Boston and Cleveland. There are, of course, serious constitutional and administrative questions involved, but the Harbor Commission is of the opinion that such power might well be granted to the City of Chicago under proper restrictions and safeguards.

# PART III.

## Summary of the Recommendations of the Chicago Harbor Commission.

*N. B. This brief Summary of Recommendations is prepared for the convenience of the reading public, but to better understand the relative importance or urgency of the recommendations, the public is respectfully requested to read the text of the Report.*

A survey of the dock lines on the Main river and the South and North branches of the Chicago River, the Lake Front and the Calumet River, and the determination of all rights of ownership.

### Chicago River (Main and South Branch).

(a) Widening the Main river to 250 feet.

(b) Completing the work of widening the South branch to a minimum of 200 feet.

(c) Replacing center-pier and narrow span bridges on the Main river and the South branch with bridges having a clear span of 200 feet with straight bottom chords instead of arched chords.

(d) Cutting off the elbow at Rush street on the south side of the river. (See page 35.)

(e) Cutting off the projecting elbow south of the Chicago and Northwestern railway bridge at the northeast angle of the main forks, and making a turning basin at the present forks of the river. (See page 35.)

(f) Straightening the river from Twelfth to Sixteenth streets. (See page 35.)

(g) Illuminating the river by electricity for navigation at night.

(h) Diminishing the current, especially in that portion of the river between Lake street and Twenty-first street.

(i) The establishment of a number of public docks on the river situated at localities convenient for the distribution of freight.

### Chicago River (North Branch).

(a) A technical engineering study for the purpose of outlining a detailed plan for the progressive improvement of the North branch.

(b) Straightening the channel at some points, especially between Clybourn and Bloomingdale avenues, at North avenue, and between Webster avenue and the crossing of the Milwaukee division of the Chicago and Northwestern railroad.

(c) Widening to 200 feet of the North branch as far as it can be done in a practical and economical manner.

(d) Replacing center-pier bridges with modern bascule bridges without abutments extending into the river.

(e) Dredging necessary to enable boats to reach the docks.

(f) Remedying the unsatisfactory conditions at Fullerton avenue caused by a sewer opening and insufficient depth of water.

(g) Dredging the turning basin just south of Diversey boulevard, particularly the east part thereof, to a sufficient depth to make it navigable.

(h) An investigation of the feasibility of deepening and widening the channel now being built by the Sanitary District and known as the North Shore Canal (Wilmette cut-off), so as to make it navigable.

### Lake Front.

(a) Reserving that portion of the Lake Front between the mouth of the Chicago River and Chicago avenue for future harbor development.

(b) Constructing piers between the mouth of the Chicago River and Chicago avenue for the accommodation of passenger, package freight and fruit lines.

(c) Reserving that part of the Lake Front from the mouth of the Chicago River to Randolph street for harbor development.

(d) The preparation at once of a plan designed to permit the creation of a Lake Front park south of Grant Park on lines which shall still make possible a future harbor development if such becomes necessary, as more fully explained

in the text of this report, this plan to be prepared by experts on park and harbor improvements working in collaboration, but subject to the final approval of the City Council and the South Park Commissioners. (See pages 38 to 43.)

### Illinois and Michigan Canal.

Securing the title to the right of way of the Illinois and Michigan Canal from the General Government and the State of Illinois for the benefit of the City of Chicago.

### Calumet River and Harbor.

(a) Widening the Calumet River to a minimum of 300 feet as far as the Forks.

(b) Replacing present bridges where the openings are insufficient, with bridges having ample waterway; and requiring that hereafter all bridges shall have two openings of 100 feet or more, or a single opening of 200 feet or more.

(c) Reserving frontage on the Calumet River for construction of public docks.

(d) Creating an inland harbor on Lake Calumet, either by the City of Chicago or by contract with riparian owners, as seems most feasible after detailed study of the legal, engineering and financial problems involved.

### Harbor Administration and Finance.

(a) Creating a Harbor Department in charge of a commissioner appointed by the mayor, to be responsible for the supervision of dock and harbor matters and the protection of shipping interests in the port of Chicago, including both the Chicago and Calumet harbors.

(b) Appointing a thoroughly competent engineer to make the surveys recommended in the Commission's report and prepare detailed plans, specifications and estimates of cost of the suggested harbor improvements.

(c) Appointing an advisory board of seven persons to co-operate with the engineer.

(d) Securing a grant, where necessary, from the legis-

lature of Illinois for the City of Chicago of power to acquire, construct, maintain and operate or lease for operation, wharves, docks, and levees and in connection therewith, elevators, warehouses and vaults; also power to acquire, operate or lease tracks and terminal facilities in connection with docks, together with the power to condemn such land as may be necessary in the creation of harbors or docks.

(e) A recommendation that careful consideration be given to the suggestions made on pages 52-53-54 of the report in regard to constitutional amendments, securing to the city greater powers for the condemnation of land, the exemption of bonds from the debt limit where such bonds are issued for revenue-producing improvements, and the exemption of bonds from local taxation.

# PART IV

## Special Reports to the Harbor Commission

1. The Development of Commercial Ports. J. Paul Goode

2. Obstacles to Chicago's Water Shipping Development. George C. Sikes

3. The Volume and Trend of Traffic To and From the Central West. George G. Tunell

# The Development of Commercial Ports

I. What the Ports of Europe are Doing
II. Chicago's Commercial Opportunity

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Report to the
Chicago Harbor Commission
By J. PAUL GOODE

# Letter of Transmittal

*To the Chicago Harbor Commission*:

GENTLEMEN—I herewith respectfully submit my report on the great seaports of Europe, with suggestions bearing on the question of the development of the water front of Chicago. This report embodies the results of a personal visit to all the ports discussed, an accumulation of the latest official records and maps, and personal interviews with the various harbor authorities.

Sincerely,

J. PAUL GOODE.

The University of Chicago.
November 10, 1908.

# Acknowledgments

In every port visited I received the most courteous consideration. The name of Chicago and her Mayor, whom I represented, proved an open sesame. The "freedom of the port" was invariably granted me, and every opportunity given to see and learn of the business of the port. I hereby tender to the following gentlemen, my sincere thanks on behalf of the Chicago Harbor Commission, for generous attention and assistance.

In Liverpool: Mr. Miles Kirk Burton, secretary and general manager; Mr. Alfred Chandler, assistant secretary; and Mr. Anthony George Lyster, chief engineer, of the Mersey Docks and Harbour Board. The Lord Mayor of Liverpool, and Mr. Percy F. Corkhill, the Lord Mayor's secretary. Mr. Allen Milne, secretary of the Liverpool Board of Trade; and the American Consul at Liverpool, Hon. John L. Griffiths.

In Manchester: Mr. F. A. Eyre, secretary Manchester Ship Canal Co.; Mr. Herbert M. Gibson, chief traffic superintendent, and Mr. A. Joynson, assistant traffic superintendent. Professor John MacFarlane of the Victoria University, Manchester.

In Glasgow: Mr. Thomas Riach Mackenzie, secretary and general manager of the Clyde Navigation; Mr. D. M. Macintyre, assistant secretary; Mr. W. M. Alston, chief engineer; and Mr. Wm. Stewart, traffic manager. Mr. Archibald Colville, and Mr. David M. Maclay of the Dalzell Steel Works, Motherwell. Mr. James Gilchrist of the firm of Barclay, Curle & Co., ship and engine builders. Mr. M. Samuel, secretary to the Lord Provost of Glasgow.

In Leith and Edinburgh: Mr. Rufus Fleming, American Consul.

In Newcastle-on-Tyne: Mr. J. McDonald Manson, secretary and general manager of The Tyne Improvement Commission, and Mr. H. J. Moscrip, assistant secretary. Mr. R. L. Wedgwood, chief goods manager, Northern Division of the N. E. Ry., and Mr. Thomas Edington, assistant goods traffic superintendent.

In London: Hon. Whitelaw Reid, American ambassador; Hon. T. H. W. Pelham, C. B., secretary of the Board of Trade; Mr. J. G. Broodbank, secretary, and Mr. R. Biscoe, assistant secretary of

the London and India Docks Co., and Mr. Charles E. Vernon, chief engineer. Mr. E. H. Bailey, and Capt. T. H. Uren, superintendents Victoria and Albert Docks. Mr. W. B. Duffield, secretary of the Royal Canal Commission and Mr. R. B. Dunwoody, engineer. Mr. G. L. Gomme, clerk, London County Council.

In Bristol: The sercretary to the Lord Mayor, Mr. Reed. Mr. F. B. Girdlestone, general manager, and Mr. A. Harvey, assistant manager of the Bristol Docks; Mr. W. T. Shapland, traffic manager of the City Docks; Mr. W. Wilkinson Squire, chief engineer; Mr. G. A. Collins, traffic manager, Avonmouth Docks, and Dr. J. Perry Worden, American Consul.

In Cardiff: Mr. James Hurman, superintendent Cardiff Railway Co., and Mr. W. J. Holloway, assistant superintendent.

In Southampton: Colonel Albert W. Swalm, American Consul; Captain G. H. Lewis of the London and Southwestern Railway. Mr. G. W. Sandell, president Chamber of Commerce, and Mr. Peter Milne Stewart, secretary. Colonel R. C. Hellard, C. B., R. E., of the Ordnance Survey.

In Havre: Mr. Alphonse Gaulin, American Consul. M. Guiffart, chief engineer of the Port of Havre.

In Antwerp: Mr. Henry W. Diederich, American Consul General. M. Gustave Aldbrecht, Alderman of Commerce, and M. Ferdinand Kinart, chief engineer.

In Rotterdam: Colonel S. Listoe, American Consul General. M. de Jongh, city engineer; Mr. H. A. van Ysselsteyn, and Mr. C. Nobel, assistant engineers. Mr. Emil G. Boerner, grain inspector for the American Department of Agriculture.

In Bremen: Mr. Wm. T. Fee, American Consul. Herr Ed. Suling, city building inspector.

In Hamburg: Mr. Otto W. Helmrich, Deputy American Consul General. Captain Fokkes, Marine Inspector, Department of Shipping and Commerce.

# I. What the Ports of Europe are Doing

## The Function of the Port

A port is a gateway between two transportation realms. On the one hand the open sea with its trackless waste, offering the best and cheapest routes for traffic with all the world; on the other hand the land, with its roadways and inland waterways carrying the commodities of trade to and from the great commercial focus, as the blood is carried to and from the heart in our vascular systems.

A port becomes a great commercial focus in proportion as certain factors are developed which determine the flow of commerce. First: The production of goods in the hinterland, which may find, by way of the port, a market in the world outside. The richer the hinterland, and the larger the flow of goods, the greater the possibilities of the port. Second: In almost equal measure as a hinterland develops its export trade, does it become an active market for the importation of goods from other productive regions, and by so much may the business of the port be increased. Third: Up to the limits of the opportunity offered by its hinterland, a port is great, in proportion as it develops the facilities for the flow of commerce, and reduces the friction incident to the breaking of bulk and the change in the character of the agent of transportation. In the simplest of mechanical metaphor, a port is a pump, the efficiency of which is high in proportion as the stream of liquid commerce it delivers is great, and the cost of operation is low. In just such measure as the pump is poor is the cost of service high and the flow small. A port may offer poor facilities because of (1) geographic, or (2) economic reasons. Examples of geographic controls are plentiful. Such are the tortuous silting channels of the distributaries of the Rhine and Weser; or bars and drifting sand as in the Delaware river, or at Galveston; or in the lack of anchorage and storm protection as at Genoa. The economic handicaps are more numerous, and often more difficult to handle. Such are unreasonable harbor dues, and poor or insufficient harbor construction; and inefficient port administration. If the need for an exit

be urgent enough a great business may be done in spite of inferior accommodations, inefficient administration, or excessive charges.

It frequently happens that a rich region may have several potential ports. Given an option in ports the business gravitates to the point of least obstruction, or greatest advantage. And as always in such cases the Lord is on the side of the strongest battalions. Illustrations we have in good measure in ports serving the rich manufacturing midlands of England, where Liverpool, Manchester, Bristol, London, and Hull are playing the great game, balancing advantages and disadvantages geographic and economic for the prize of freight; in the ports at the mouths of the Rhine, Weser, and Elbe, competing for the rich favors of the German hinterland; or right at home, and on the largest scale, in the struggle between Boston, New York, Philadelphia and Baltimore for the service of the phenomenally productive hinterland west of the Appalachian highland. In the study which follows, an attempt will be made to evaluate the factors geographic and economic, in an interpretation of some of the world's great commercial foci.

## Statistical Comparison of the Growth of Ports

As to commercial importance ports may be compared in several ways. For example, in *net register tonnage*. And this either in tonnage entered or cleared, or in the sum of the two. A comparison made on this basis will not be perfectly fair; first, because the rules of registry differ somewhat in the different countries. Then too, the records differ as to whether coasting trade is counted in or not, the practice varying in different lands. And on this score the records are always against American ports, for our coasting trade, which we usually do not count, covers a coast line comparable to that of all Europe, and some of it may make journeys 12,000 miles or over in length. All such traffic in Europe, because of the small size of the European countries, is foreign trade and is counted in. Then again a vessel may take on load in a number of ports, being credited to each in turn, the entire tonnage being credited to a port if only a bag of mail changes hands. In English ports fees are charged for every entrance and in some cases for clearance as well, which encourages the taking on of a complete load at one port. In France, however, the navigation tax is paid but once, and the result is a greater freedom in the routing of ships, the tendency being to call at more than one port. Notwithstanding these drawbacks, the difficulty of getting complete data

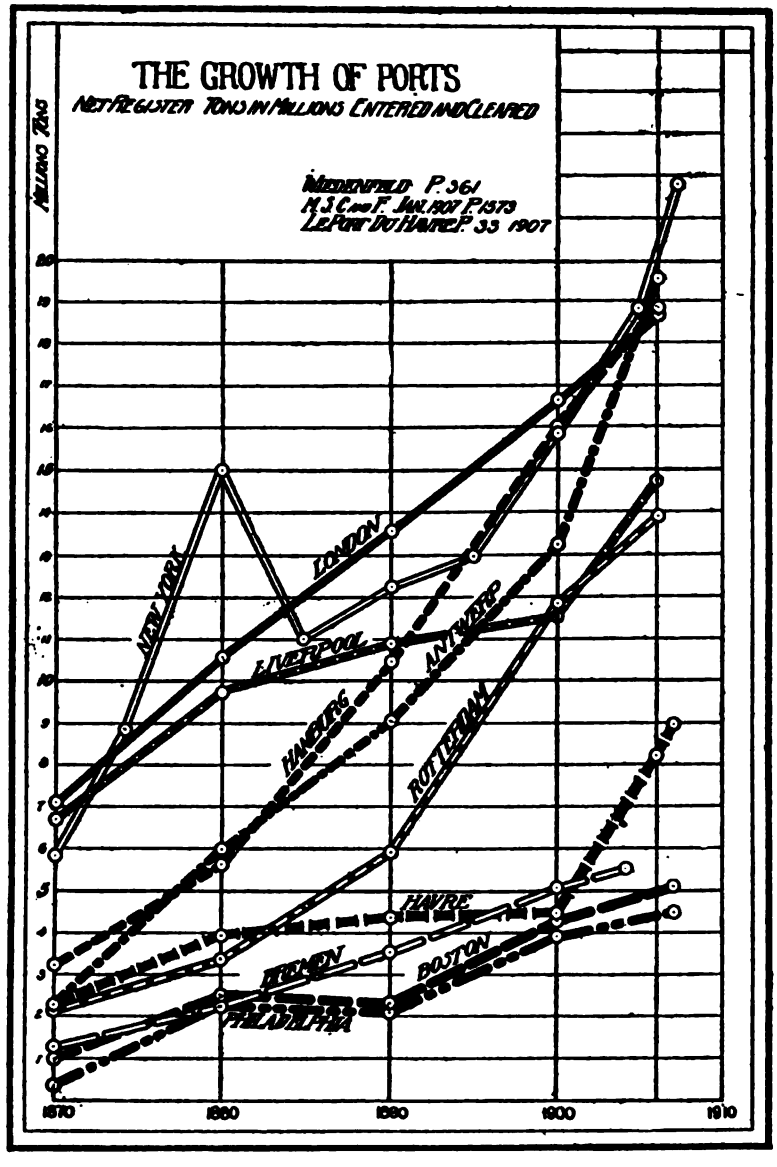



Fig. 1. The growth in tonnage of some of the great ports.

for comparison on other lines, such as the value of the goods, or the actual weight of merchandise handled across the ship's rail, leaves the net register tonnage as the basis of comparison most widely available.

For the purpose of our study we need not go back of the year 1870. This date marks the beginning of the age of steel in transportation; for it is the use of steel in railway rails and equipment, and the introduction of steel in ship-building, which has made the recent vast industrial and commercial expansion possible. Throwing into graphic form the record of growth in net register tonnage

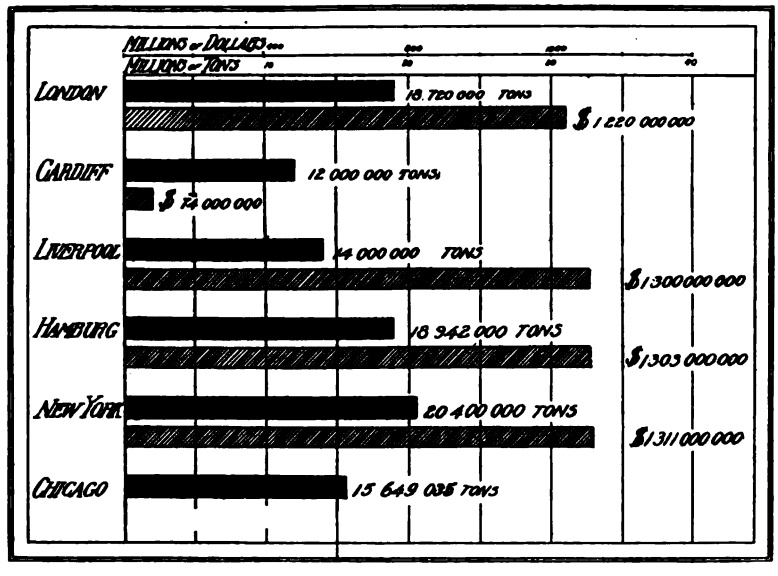



**Fig. 2. Comparison in various ports of the net register tonnage and value of goods in foreign commerce.**

of some of the world's chief ports. (Fig. 1) not only is the great expansion in traffic very striking, but the rate of development is very instructive in the various ports. The adequate interpretation of this series of curves would lay bare all the factors at work, both geographic and economic. The most striking development is that of Antwerp, Hamburg and Rotterdam. These three, with Amsterdam are the gateways for the world trade of Germany. New York is next most striking, but her hinterland is almost the whole continent, and the disparity between New York and Boston-Philadelphia-Baltimore, the other rightful heirs to the same hinterland, is

an open challenge for the rules of the game by which economic handicaps and favors in the traffic of these ports are allotted

Where a comparison of the value of goods handled can be set alongside the weight of goods handled, or even the net register tonnage, an interesting light is thrown on the character of the trade of the ports.

In the graph (Fig. 2) a selected half dozen ports are arranged in the order of the value of their traffic and compared also as to their tonnage. It is instructive to note the comparison of Cardiff with the other ports. London with only 50 per cent more tonnage than Cardiff, handles goods worth fourteen times as much. This is because the trade of Cardiff is almost wholly the shipping of coal, ships coming in light and going out with coal cargoes of relatively low value. London, Liverpool, Hamburg and New York on the other hand have active imports as well as exports, and both imports and exports are largely of manufactures and other goods of high value. Chicago in this comparison shows relatively low values because the lake trade is largely in coal, iron, lumber, grain, and other raw materials.

Another instructive comparison of ports may be made in the harbor facilities provided for traffic, that is, the extent and quality of the physical equipment. This will include the character of the channel and anchorage; the extent and quality of docks and ships; the quays, piers, cranes, railways, sheds, warehouses, and other means provided to facilitate the handling of ships and freight, and so reduce the time and costs of the process. In these matters there is the widest divergence in practice in the various ports, but this difference is apparently due to differences in administration and the ideals underlying the organization of the port. A discussion later of the organization and administration of ports will be quite relevant to our inquiry.

One other basis of comparison is available, and that is, the growth in population of the city of the port. For the more active and efficient the port, the larger the opportunity for manufacture and trade, and hence the larger the invitation for a city population.

The case of London in this comparison is the most striking of them all. The metropolis of a rich land, with the prestige of centuries of well ordered business, the population has grown at a rapid and surprisingly uniform rate (Fig. 3). New York shows a more rapid increase in the last eighteen years than any other port, and this growth is commensurate with its increase in traffic. The growth of Chicago as compared with New York is somewhat

disappointing. We are not living up to our opportunities, either in traffic, or in growth in numbers. New York has her network of railways just as Chicago has, but has also her marvelous ocean traffic, which Chicago may some day have, but has not yet achieved.

The case of Liverpool is quite instructive. While the population of New York in the last 38 years has quadrupled, the population of Liverpool has only doubled. But that is because Liverpool has been content to serve merely as a gateway to the rich hinter-

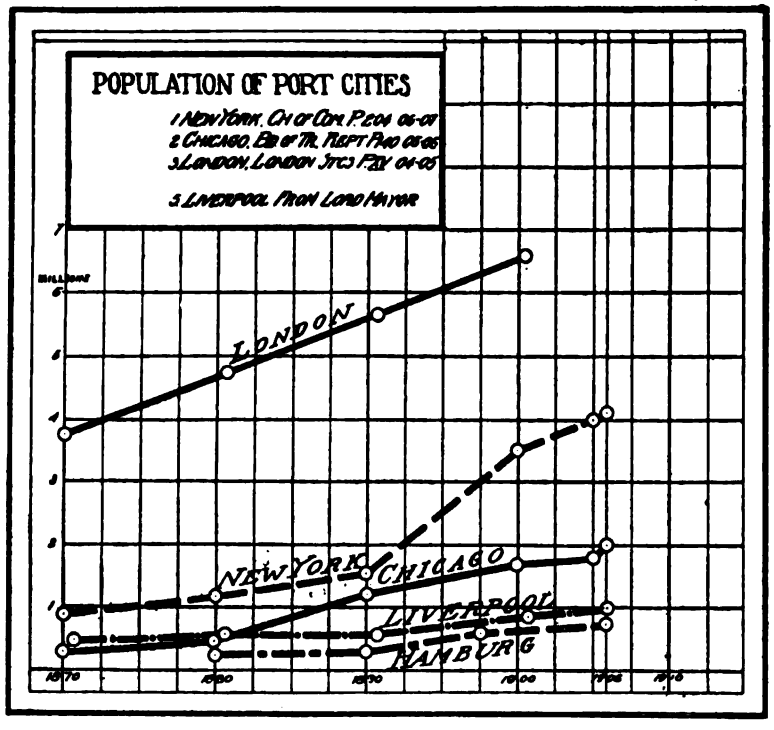



**Fig. 3. Graph showing the population of selected port cities, through a period of years.**

land of the Midlands. But little attention has been paid to the development of manufacture, which the advantages of the port would warrant. Hamburg, with a curve quite similar to that of Liverpool, makes a much more creditable showing, for in 1866 Hamburg was only a river village. In the one generation since then the port has risen to third in rank in all the world, on the basis of tonnage, surpassing London, and with every promise of holding the vantage won. Hamburg is now making vigorous effort

to establish manufactures in the port, and it will not be long before the city in population will rank above that of Liverpool, as her traffic for some years has done.

## An Economic Interpretation of a Few Great Ports

It will be helpful as a basis for the understanding of our own port, and its possibilities, to make a somewhat careful examination of some of the world's leading ports. For convenience we may study each port:

(1) With reference to the hinterland it serves;
(2) As to organization and administration;
(3) As to port facilities for handling traffic;
(4) As related to inland systems of transportation, street, railway and waterway.

## The English Midlands

Let us take first the ports serving the English Midlands. The bank account of British Industry is her magnificent resource of

**Fig. 4. The midlands and the coal fields of England.**

coal. This is the force which turns the spindles, forges the steel, and converts the raw products of half the earth into the manufactured articles of high value for the markets of all the world.

It is the coal of the Midlands (see Fig. 4) which calls for the ores of Spain, the lumber of Canada and Africa, and the wheat and meat of America and the Argentine to feed the working millions. So trade in great volume flows to and from the Midlands rich in coal. The natural ports for this region are in the river mouths draining the area and the ports in active competition for the business of the region are Liverpool, Manchester, Hull, Newcastle, and Bristol, with London reaching long arms after a share of the traffic.

## Liverpool

The most important of these ports is Liverpool. Situated on the estuary at the mouth of the River Mersey, Liverpool is the logical gateway of the western half of the Midlands. It also reaps the advantage of being on the side of England next to America, from which the cotton has come for the spinners of Lancashire, and from which the food has largely come for the manufacturing population.

While the estuary furnishes an ample anchorage protected from the winds and violence of the open sea, and in so far was a natural harbor, it is very heavily handicaped, in opening directly toward the advancing tidal wave of the Atlantic. This gives a tidal range of 31 feet, and makes the problem of shifting sand bars an extremely difficult one to face. Yet the advantage of position is so great, and the organization of the port authority so effective that the difficulties have been met, and a port developed which in many respects has no peer on earth. This success is mainly attributable to the form of organization and method of administration of the port, and it will be worth our while to give a somewhat detailed account of the port administration in this case.

*The Port Administration.* Prior to the year 1857 the docks and works in connection therewith on the Liverpool side of the Mersey were under the control of a Dock Committee, subject to the Town Council of Liverpool. The docks on the Birkenhead side of the river had been managed by a private company, but later had been acquired by the city of Liverpool. By the Mersey Docks and Harbour Act of 1857 the control and management of all the docks at Liverpool and Birkenhead become vested in a Public Trust called "The Mersey Docks and Harbour Board." This Board consists of twenty-eight members, of whom four are appointed by the Crown, and twenty-four are elected by the dock ratepayers. The term of membership, whether by appointment or election, is four

years, with privilege of re-appointment or re-election. The members elected by the Dock Ratepayers must reside within the customs port of Liverpool, or within 10 miles of the outward boundary of the Borough. A candidate "must pay to the Board within the year immediately preceding his election, rates in respect of ships or goods of not less than £25." Members receive no remuneration.

The qualification of an elector is the payment, without regard to the place in which his business is carried on, of rates on ships

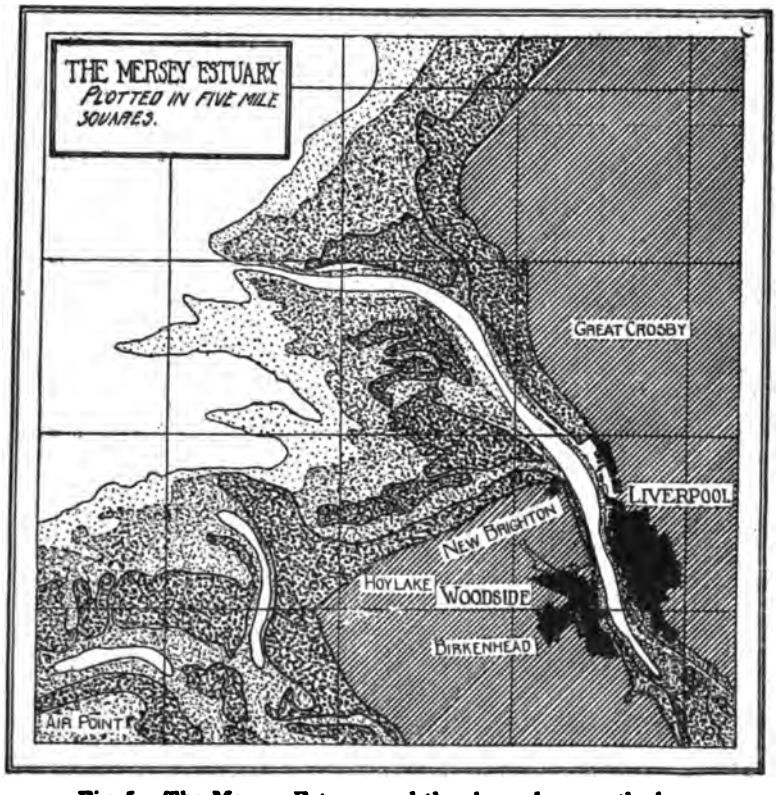



**Fig. 5. The Mersey Estuary and the channel across the bar.**

or goods, of not less and £10 in the year preceding the election. He must be a British subject, or if a foreigner be resident in the United Kingdom and his name must be on the list of dock electors. There is only one vote for each member to be elected, and there is no voting by proxy.

No member may hold any office or place of profit under the Board, or may participate in the profits of any work done by the

Board, or in any contract entered into by the Board. Exceptions to this are made in the case of water or gas or lands supplied to the Board by sale or lease, or money loaned to the Board. But on any such transaction a member may not vote.

The Board being a corporate body, holds property and transacts business like any other individual, under regulations prescribed by Parliament. All the property of the Board is considered as one estate and is managed as such. Taxes are paid upon this estate on the basis of income, just as in the case of any private person or business. The Board raises capital funds by borrowing on bond issues, on the security of its income, and lays aside a sinking fund to retire these bonds. This form of organization has given the maximum of independence to the Board. It has always had funds enough and it spends on its own judgment, without let or hindrance. No greater freedom is possible anywhere, and all evidence goes to show that its powers have been used with great wisdom and discretion for the good of the port.

The Board has an absolute monopoly in the port. It has power to license and regulate pilots, and fix pilotage rates; to impose and collect dues on goods handled to or from the town or country beyond; and to fix rates and fees on ships for use of harbor, dock, berths, quays and equipment. The Board lights the harbor and the estuary, and at an enormous cost for dredging, has converted what was originally "a creek of the port of Chester," into one of the most important ports in the world, with a 35 foot channel at low water, out across the bar.

The Board elects its chairman, and delegates work to committees. It meets regularly every Thursday, and most of the committees have weekly meetings. Though no salaries are paid to members, the most earnest service is rendered. There is a very considerable corps of paid officials: the general manager and secretary, engineer, solicitor, treasurer, harbor master and assistants, accountants, receivers, auditors, marine surveyors, bailiffs, police, inspectors, watchmen, laborers, etc., a small army in all.

It will be instructive to see in some detail how the Board acquires and spends its income. The fiscal year closes July 1, and Parliament requires the publication of a detailed account of receipts and expenditures. This report is issued very promptly and is a model of its kind. Power to borrow on bond issue has been granted by various Parliamentary acts from 1859 to 1906, and bonds have been issued at various rates of interest from 4½ per

cent to as low as 2½ per cent. The total borrowing power granted up to July 1, 1907, was:—

| | |
|---|---|
| Amount authorized | £31,886,695- 2-10 |
| Amount borrowed | 24,559,817-14- 2 |
| Balance, power unused | £ 7,326,877- 8-10 |

The total amount expended by the Board from 1859 to July 1, 1907, was £29,990,150 -0 -8, or about $150,000,000. The amount set aside for the sinking fund account in 1906-7 was a half million dollars. During the same year the engineering work cost over $1,000,000. The table of general receipts and expenditures for the year will be instructive:—

## Mersey Docks and Harbour Board—Statement of General Receipts and Expenditures—Year Ending July 1, 1907

| | | |
|---|---|---|
| DR. | | |
| To interest | | £ 904,799-12- 6 |
| Engineers' Dept. | | 233,934- 2- 8 |
| Harbor Master's account | | 46,969-14-10 |
| Dock Traffic Dept., Ry., Weighing, etc.. | | 152,439- 8- 1 |
| Police expenses | | 45,562-16- 2 |
| General charges | | 97,857-16-10 |
| Parliamentary and law expenses | | 1,992-16-10 |
| Rates and taxes | | 91,484- 4- 7 |
| Fire insurance and depreciation of vessels | | 77,979-16- 1 |
| Grant to Conservancy Acct. dredging... | | 6,600- 0- 0 |
| | | £1,659,620- 8- 7 |
| Balance— | | |
| Amount carried to sinking fund | £100,000- 0- 0 | |
| To unappropriated receipts account | 32,561-15- 4 | |
| | | 132,561-15- 4 |
| Total | | £1,792,182- 3-11 |
| CR.. | | |
| By rates and dues | £1,359,026- 3- 3 | |
| By rents of property ... | 164,310- 6- 9 | |
| By Dock Traffic Dept., Ry., etc. | 184,663-14- 1 | |
| | | £1,707,900- 4- 1 |
| By warehouses surplus.. | | 84,281-19-10 |
| Total | | £1,792,182- 3-11 |

And a further analysis of the one big item of income, Rates and Dues, will not be amiss.

## General Receipts, Year Ending July 1, 1907

CR.

| | | |
|---|---|---|
| By Rates and Dues— | | |
| Rates received on vessels: | | |
| Dock tonnage rates | £ | 699,105-19-10 |
| Graving dock, and gridiron rates | | 40,292- 0- 9 |
| Dock rent | | 7,931- 3-10 |
| Rates and dues received on goods: | | |
| Dock rates | | 369,875- 7- 9 |
| Town dues | | 314,702-18- 2 |
| Less dock tonnage rates applicable to Conservancy Acct. | | 73,022-18- 1 |
| Total | £ | 1,358,884-12- 3 |

This handsome revenue of nearly $7,000,000 is the culminating term in a long record of gradual growth almost entirely free from retrograde steps. The figures are available for every year since 1752. Charted (Fig. 6), we can see at a glance, the phenomenal development of this port. With the introduction of iron ships the business of the port went up with a bound. The depression of the American Civil War is very conspicuous. Too much prosperity brought the agitation for a canal to Manchester and a reduction in charges, lowering the income and flattening out the curve. But since 1900 the old rate of increase has been resumed.

The dues and charges in this port are very high, but since this is the common practice all over Britain, it is a difficulty the shipper and merchant can not evade. It is established custom. The general government practically turns over its powers to the port. It neither lights nor buoys nor dredges the harbor or channel out to sea. All the prodigious work of making a port in the teeth of a tidal range of 31 feet, and the silting of the estuary, and the shifting sands on the submerged delta, has fallen upon this unaided corporation. Not a dollar has come from government nor from the city. By the method of selection the members of the Board are the most alert and able business men of the region. Men whose daily lives are devoted to business which is dependent upon the administration of the port, and whose business success is part of the success of the port management. On every hand in Liverpool one hears the highest praise for the Board. In business it is considered the highest honor a man may earn to be given a seat on the Board.

One gentleman described the honor as so much coveted that a well advised young man would shape every act from his first day in the business world with reference to this possible future goal. Though no remuneration of any kind is given for service, there is seldom a vacant seat at the weekly meetings of the Board.

The paid officials are of the highest type. The position of general manager is as responsible as the presidency of one of our greatest railways, and requires as rare ability. The chief engineer has problems as difficult to handle as are met with in the science. Such able men, tried and proved, hold their positions indefinitely,

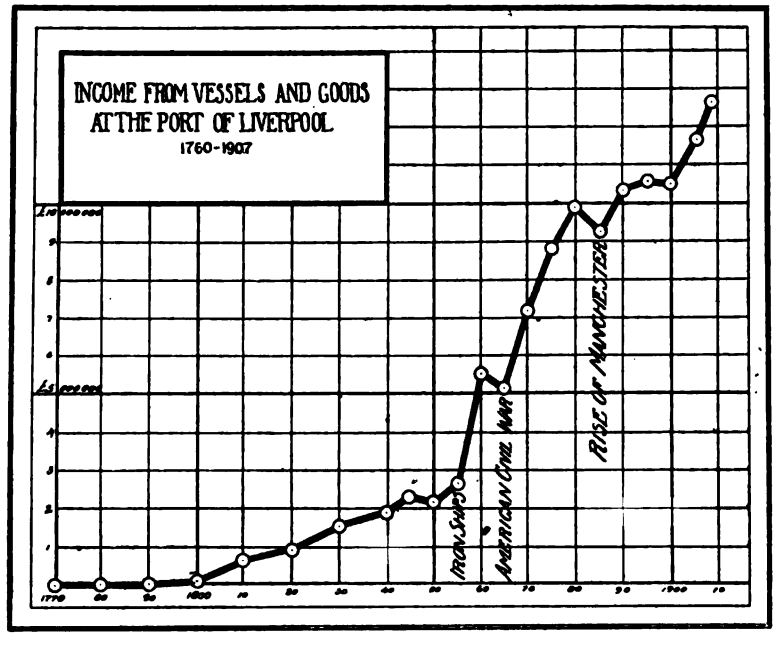



**Fig. 6. The earnings of the Port of Liverpool, 1760-1907.**

at the pleasure of the Board. The present general manager, Miles Kirk Burton, Esq., a man of superb efficiency, has held his position for a generation. The chief engineer, Anthony George Lyster, Esq., a man of the highest ability, grew up in the problems of the harbor, his father before him being chief engineer for a long term of years. Mr. Lyster is putting into commission at the present time a monster sand pump dredge, which will lift 10,000 tons of sand in 50 minutes into its own hold, and steam out to sea and scuttle its load. This dredge, more than twice as large as the next largest in the world is only an incident in the problem of maintain-

ing a channel across the bar so that the largest Atlantic liners may make their port at any stage of tide. Liverpool is the home port of the great Cunarders, Mauretania and Lusitania. There are only three or four ports in the world that can take boats of this size, and yet the far sighted gentlemen of the Mersey Docks and Harbour Board see plainly that there will be larger boats yet. And as an illustration of the simplicity and freedom of the organization of such a board, it will be instructive to see how easily a great improvement is undertaken. Discussing the growth of commerce, the need of a larger dock was seen. The engineer provided plans and estimates, which after mature deliberation were approved, and without asking the permission or approval or support of anybody, except a parliamentary permit for general harbor improvement, an extension was voted April 30, 1907 to provide a dock with berths for four ships at once, with lengths up to 1,100 feet, and 120 feet beam; and with quays, sheds, railway tracks, and driveways accompanying — involving an expenditure of $16,000,000. So when the larger ships arrive, Liverpool will have room and welcome for them.

This freedom in organization has resulted in a port of the highest excellence in plan, construction, and management. The 31 feet range of tide makes it necessary to provide docks with locks and gates, which will let ships enter with the sea at any level, and give berthage in docks and basins, with water at a fixed level. Such gates are enormously expensive, nearly one-half the cost of the latest $16,000,000 extension being in the gates. Moreover it is the practice of the Board to make all construction of the most durable sort; quay walls of masonry, or concrete, and coping of granite; sheds of steel, or brick, or concrete, with slate or tile roof. Everything is fire proof, and built for all time. Landing for ferries and Atlantic liners is affected at any stage of tide by great floating piers, connected with the shore by inclined bridges. The main landing stage at Liverpool where the transatlantic liners embark or disembark passengers is 2,478 feet long, with eight bridges connecting it with the shore. Here the railway comes to the water's edge and passengers and their baggage are transferred under cover directly from ship to boat or vice versa. For loading or unloading freight, the vessels must be locked in or out of the docks.

Under such conditions each unit of dock space is worked as efficiently as possible, and docks and basins are no larger than is necessary to do the work of the port. On January 1, 1908, there were in Liverpool 53 docks and 16 dry docks, and in Birkenhead, 8 docks and 3 dry docks. The total water area of the docks and

basins in Liverpool and Birkenhead was 583 acres 1,115 yards, with a lineal quayage of 36 miles 255 yards. The total area of the Dock Estate, exclusive of undeveloped fore-shore was 1677½ acres. Upon this estate the government assessment as a basis for the income tax is £940,000 a year, that is, the government assumes that the Board's annual income is $4,700,000.

In addition to supplying docks and sheds, the Board has many warehouses for various sorts of goods, where stocks may lie for almost any length of time, the merchant paying storage. The new tobacco warehouse at Stanley Dock is 723 feet by 165 feet, and 13 stories high. It is of brick, with steel beams and posts and concrete floor. It has a capacity of 66,000 hogsheads of tobacco, and a great deal of tobacco lies in storage for years before being used. There are other great warehouses for salt, grain, wool, hides, oil, etc., and from all these the Board derives an income.

Another source of income is in the carting of goods from the quay to the railway, or the reverse. In Liverpool the most conspicuous feature of the work of the docks is that everything with the exception of coal and bulk oil, is handled to and from the ship on horse drawn drays, or "lurries" as they are called. In 1901 it was estimated that over 90 per cent of the total traffic of the port was handled by these horse carts. And even so the charge for handling was very low, only a shilling a ton, while in London where railway carriage is much more in use, the cost of handling ran to several times that. In Liverpool since 1901 there has been a rapid extension of railway tracks to serve sheds and quays, all the newer installations providing for the transfer of goods to and from the car direct. These tracks are built and owned by the Board, and a number of switching engines are provided also by the Board to handle the cars in and out. The total railway trackage on the estate in June, 1908, was 80 miles. No charges are made for the use of these tracks, and under special stress the locomotives of the great railway systems bring in or take out trains through the Dock Estate.

Inland transportation between Liverpool and the hinterland is almost wholly done by the railways. There is a canal connecting with the network of canals of the Midlands, but it plays but a sorry part in the total traffic of the port. The rise of Manchester as a sea port, has practically canceled what might otherwise have been a considerable barge traffic up the Mersey, for with the canal in operation vessels go to their dock at Manchester and intervening points without lightering.

## Manchester

The case of Manchester is intensely interesting and full of significance for us in Chicago. For Manchester is an example of a seaport created to order. An example of whole hearted and intense battle on the part of a community to be free of railway and other impositions upon her commerce. The men of Manchester felt that too large a toll was levied at Liverpool and other ports, upon the cotton and sugar and timber and other commodities brought in, and upon the manufactures shipped out.

Manchester is the focus of the vast cotton interests of Lancashire, Derby and York, one of the busiest parts of the midlands. In the Manchester Exchange there are representatives of 177 towns, eleven of which have each a population of 100,000 or over. The city is more like Chicago in its rush and grime and the magnitude of its undertakings than any other city in Britain. The Manchester Chamber of Commerce is a body of men the peer of such bodies anywhere. It was the vigorous activity of this chamber, and of the Manchester Commercial Association, more than anything else, which was instrumental in compelling the establishment of the Public Port Trust in Liverpool in 1857, taking the matter out of the hands of the City of Liverpool. By 1880 they realized that they were not getting the advantages in transportation they were entitled to, so they began an agitation for a ship canal, which should make their own town a seaport of the first rank. The entire city came to the support of the venture and subscribed liberally to the fund necessary to go to Parliament for powers. The problem was infinitely difficult. For to get an enabling act with powers adequate they had to do battle royal with all the railways in the region, with all the shipping interests of Liverpool, with all the land owners along the 35½ miles of the canal route, with various small towns with rights in waterways which would be changed, and with every other vested interest which could be brought to bear against them. Twice they were defeated in Parliament by the vested interests, but the third time they won, and it cost $750,000 to get past Parliament. It should be food for thought in America that in all this parliamentary warfare not one whisper or suspicion of graft or unfair play was ever raised on either side. The bill provided an organization which is somewhat anomalous in port administration, that of a stock company—the Manchester Ship Canal Company—the stockholders choosing the officers and determining the policies. But the purpose was avowedly to serve the common good; not to work for profit, but to establish

fair play in the handling of goods to and from the city. In effect it was a public trust seeking the same powers as the Docks and Harbor Board at Liverpool. When, August 6, 1885, their bill became a law, their stocks were subscribed by a patriotic public to the extent of nearly $50,000,000, and work was begun. But the engineering difficulties and costs were greater than could be foreseen, and the company was compelled to ask the Corporation of Manchester to come to their assistance with a loan. The city furnished the loan, and later another, a total of $25,000,000. But the canal was not opened for traffic to Manchester until November, 1893, and with no earnings the interest on the city loans fell into arrears, and a new obligation of over $5,000,000 was incurred for interest. The city then demanded and obtained representation on the board of directors, so that the directorate now stands:

10 elected by the shareholders.

11 appointed by the Manchester Corporation.

Shareholders have one vote for each share up to 10; one extra for each additional 5 shares up to 100; and one extra for every 10 beyond. The chairman is chosen by his colleagues from amongst the ten directors elected by the shareholders. The shareholder directors hold office for three years and are eligible for re-election. The corporation directors are chosen by the city council, the term of office limited to the term for which they are elected to the council—aldermen six years, councillors three years.

The chairman of the company devotes the whole of his time to the affairs of the company and is remunerated accordingly. In addition to this $10,000 per year is distributed pro rata amongst the remaining directors according to attendance.

Thus at the present the control is dominantly, though indirectly, municipal. The Canal Company is now paying all interest, and will soon be paying off the city loan. When this shall be reduced to $12,500,000, the city will appoint seven directors only; and when the debt is all paid, the directorate will be reduced to 15, two of which shall be appointed by the city corporation.

It was a gigantic venture to bring a channel 290 to 370 feet in width at the top and 120 to 170 feet at bottom and 26 feet deep from the sea 35½ miles into the land, and lift it sixty feet and six inches. Forty-six hundred acres of land had to be bought, at a cost of $6,435,025, and the Bridgewater Canal, which crossed the right of way, and another canal, the Mersey and Irwell Navigation, had to be bought at a cost of over $6,000,000. Five railway crossings were provided with high level bridges, 75 feet in the clear, ap-

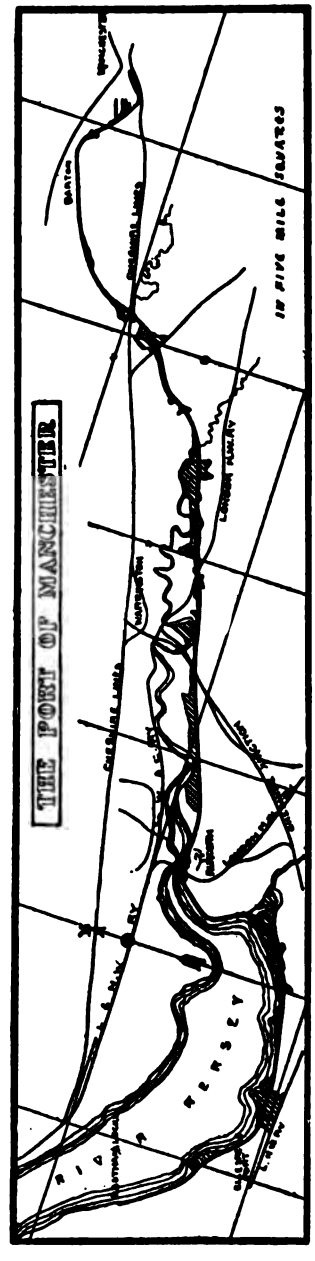



Fig. 7. The Port of Manchester, showing the ship canal from Eastham Locks to Salford Bridge, 35½ miles. The shaded areas are lands owned by the Manchester Ship Canal Company, and which are being taken as sites for factories and commercial enterprises. Every mile of the canal is available for this purpose.

proaches graded to 1 in 135. The total excavation was over 51,000,000 cubic yards, or over half that of the Suez Canal. The magnitude of the undertaking may be seen by a statement of the capital created by the company:

**Capital Created by the Manchester Canal Company**

To June 30, 1907.

| | |
|---|---|
| Manchester Ship Canal Acts 1885-6 | £ 9,812,000 |
| Manchester Ship Canal Acts 1900 | 600,000 |
| Manchester Ship Canal Acts 1891 | 3,000,000 |
| Manchester Ship Canal Acts 1893 | 2,000,000 |
| Manchester Ship Canal Acts 1897 | 100,000 |
| Manchester Ship Canal Acts 1904 | 1,572,281 |
| Total capital | £17,084,281 |

When Chicago made the drainage canal it was a great undertaking and all the world heard of it. But Manchester, with only a fraction of the population or wealth of Chicago, has raised over $85,000,000, which is considerably more than the investment of our great canal. Upon the capital created by loans and debenture stock, $50,000,000 is at 3 1-5 per cent; $15,590,000 at 3½ per cent, and $10,980,000 at 4 per cent. This burden is now being carried, and it is expected that this year a small dividend will be paid upon common stock. The semi-annual meetings of the directors are held in the Town Hall, and are occasions of very great local interest. A public statement is there made of the half year's business and of the financial status of the company. As in Liverpool, the itemized accounts of the year's receipts and disbursements are public property.

The Manchester Ship Canal Company was organized with the advantage of the knowledge of a century's experience in expansion in the ports of Britain. It is very instructive to notice that from the first the plan was for a complete monopoly of the business of the port. There was complete freedom within the common restrictions imposed by Parliament upon all ports, in assessment and collection of dues and fees. The docks, piers, wharves, quays, sheds, warehouses, railway tracks, locomotives, cars, lurries, motor trucks, cranes, pipes, chutes, legs, shears, floats, tugs, scows, barges, lighters, pontoons, flats and all the other devices used in handling the freight to and from the ships are owned and worked by the company. Vessels are loaded or unloaded by the owners of the cargo if they wish, and if not, by the company, but the work is done almost wholly by the company. The labor situation is much improved by having but

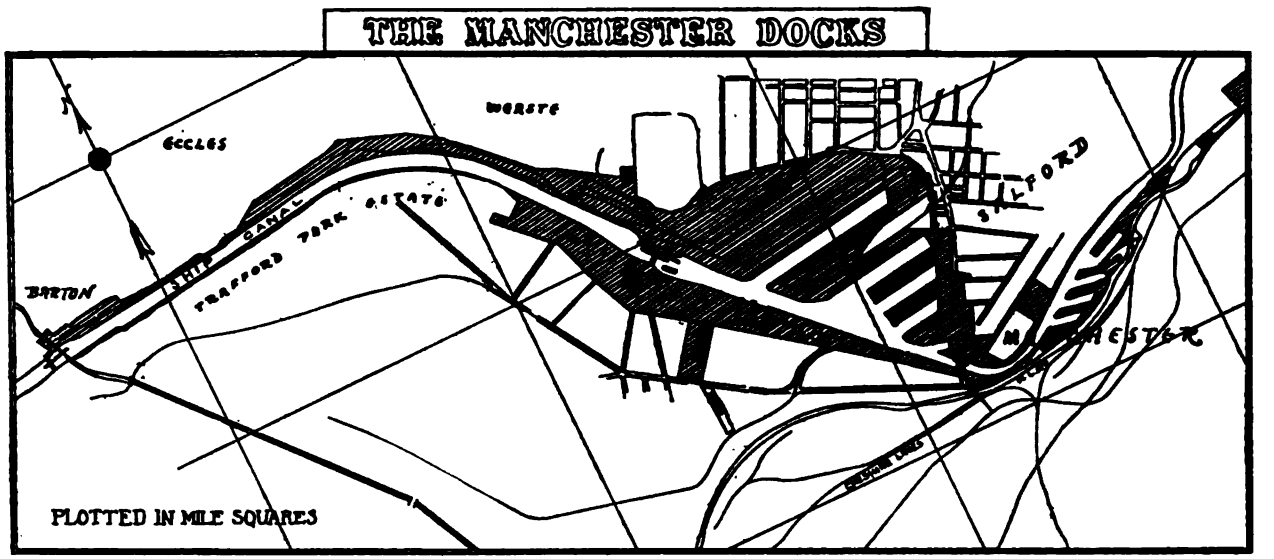



**Fig. 8. The major part of the dock facilities are in the City of Salford on the right bank, or in the western edge of the City of Manchester on the left bank of the canal. The Trafford Park estate is now being developed as factory sites and for various commercial purposes. The city is rapidly growing westward.**

one employer in the port. It is possible to increase the number of men given continuous work through the year, so reducing the number of casual laborers so much a problem in all the ports of the world. Hence the quality of labor is kept at a much higher level, and strikes are almost unknown.

As is usual in Britain and the continent, the quality of construction is high. Quay walls are of masonry or concrete, faced with vitrified paving brick and coped with great blocks of granite. Sheds are wide, of brick, or better, of ferro-concrete, the best type being four or five stories high, the roof flat and of concrete, carrying the traveling cranes, and available for storage of lumber, casks or other goods which can stand the weather. The cranes are electric, either on the roof or on the tracks on the quay, and are most efficient. Railway tracks are provided on every quay for direct loading or unloading—tracks also through the sheds to be served from the sorting floors. The company owns its own cars and locomotives and does its own switching and has ample siding yards where trains are made up. In case the railway companies are too slow in taking away the loaded trains, the company may take them out by their own locomotives over the right of way of the delinquent company. The freight situation is controlled by the company absolutely.

As constructed, 26 feet was the deepest draft permitted in the canal. But within the present year this has been deepened to 28 feet by holding in two feet more above the tide gates in the lower reach, and by dredging in the upper reaches. This gives a cargo capacity for 360 days of over 150,000,000 tons, for over 70 vessels a day can pass the locks.

All this prodigious outlay of $85,000,000 and over was made by the people of Manchester and vicinity because they felt that the port charges at Liverpool were too high, and that the railway charges between Liverpool and Manchester were unjust. "A working district as big as a small nation made this supreme effort in a determination to break a grinding and increasingly indifferent monopoly." Manchester is now the nearest port for a population of 8,000,000 people. The battle is won. And it is instructive to notice what happened to freight rates so soon as the canal was assured. I quote from the evidence of Mr. J. K. Bythell, chairman of the Manchester Ship Canal Company, before the Royal Commission on Canals and Waterways, the 67th day, Tuesday, November 26, 1907: (Minutes of Evidence, p. 22.)

"On the promotion of the ship canal in the early eighties the following reductions in the class rates between Liverpool and Man-

chester were made by the railway companies: Class C, from 7s 6d to 7s, station to station; Class 1, from 8s 4d to 7s 11d; Class 2, from 10s to 9s 2d; Class 3, from 11s 8d to 10s 10d; Class 5 was reduced from 17s 6d to 17s 2d in 1893 (the year before the ship canal was completed). No changes were made in the rates for Classes B and 4. Reductions were also made in the exceptional rates in the early eighties in respect of important articles: Cotton from Liverpool to Manchester was reduced from 9s to 7s 2d; cotton goods and yarns for export, Manchester to Liverpool, from 10s to 8s, collected at Manchester; timber, Liverpool to Manchester, from 7s 11d to 6s 8d, in two-ton lots, station to station. The rates charged as above stated are in operation today. Since the canal was opened a few exceptional rates have been made for special cases, but it may be said that the rates between Manchester and Liverpool have practically remained unchanged. Between Manchester and northern European ports, via East coast ports, there has been, however, a large reduction in the combined rail and steamer rates. This is where the competition is the keenest. Before the ship canal was opened for traffic the charge for cotton yarn from Manchester to Rotterdam was 32s 6d. It has been reduced to 22s 10d.

"Machinery in parts, packed in cases, Manchester to Hamburg, has been reduced from 27s 6d to 17s 6d. Sugar from Hamburg to Manchester has been reduced from 21s 9d to 12s 6d. These are typical examples. It may be said in round terms that the rates for other articles have been reduced proportionately.

"Some of the Liverpool dock rates have also been considerably reduced in competition with the ship canal. During the progress of the first ship canal bill in Parliament, the dock due on cotton was reduced from 3s 6d to 3s per ton. As soon as the port of Manchester began to draw cotton the rate was reduced to 2s. As soon as Manchester began to draw grain, the following reductions were made: The dock dues on heavy grain (wheat and maize) were reduced from 1s 4d per ton to 1s at Liverpool and to 6d at Birkenhead."

The Manchester people have won their case, but it has required the keenest and most courageous fighting. After they began to handle freight they were discriminated against by the railways, and were in a good way to fail for lack of power in the control of freight movement. They had to appeal to the Railway Commission and try a case in court before they could get recognition from the railways as a statutory railway company, competent to make rates. They now work as a terminal railway and negotiate business from

individual shippers, furnishing them through rates to or from any point on earth, every expense and terminal charge included, and they can demonstrate a cheaper rate in the region they serve than the shipper can get via Liverpool. It will be worth our while to record a special case or so taken from the books of the canal company.

### (1) December 4, 1907, Shipment of Cotton, Memphis, Tenn., to Oldham, Eng., in Cents per 100 Pounds

**Via Manchester**

| | |
|---|---|
| Memphis-New Orleans, f. o. b. S. S. | 27.00 |
| New Orleans-Manchester | 38.00 |
| Manchester-Oldham, railway and all port charges | 10.45 |
| | 75.45 |

**Via Liverpool**

| | |
|---|---|
| Memphis-New Orleans, f. o. b. S. S. | 27.00 |
| New Orleans-Liverpool | 38.00 |
| Liverpool dock and town dues | 2.14 |
| Master porter | 1.25 |
| Cartage to railway station | 1.34 |
| Railway Liverpool-Oldham | 9.82 |
| | 79.55 |

| | |
|---|---|
| The Liverpool total rate | 79.55 |
| Minus Manchester total rate | 75.45 |
| A saving of | 4.10 |

That is, the spinner at Oldham can save by the Manchester route 91.84c per ton of 2,240 pounds. But this is not all, for there is a forwarding charge at Liverpool of 25c per ton, and some extra insurance.

### (2) December 21, 1907—150 Bbl. Cotton Seed Oil Soap, Norfolk, Va., to Manchester, via New York— in Cents per 100 Pounds

**Via Manchester**

| | |
|---|---|
| Railway Norfolk-New York, per 100 lbs | 12.00 |
| New York-Manchester | 16.88 |
| Manchester Canal dues | 4.29 |
| Quay porterage (3 days) dd. to cart | 1.70 |
| Cartage to works | 2.14 |
| Total | 37.01 |

**Via Liverpool**

| | |
|---|---|
| Railway Norfolk-New York, per 100 lbs | 12.00 |
| New York-Liverpool | 16.88 |
| Liverpool dock and town dues | 1.875 |
| Master porter (shed, etc.) | .893 |
| Cartage to railway | 1.340 |
| Railway Liverpool-Manchester | 8.040 |
| Cartage to works | 2.140 |
| | 43.168 |

This shows a saving of 6.158c via the port of Manchester, or $1.379 per ton of 2,240 pounds.

It may seem surprising that with these advantages put before a merchant, the port of Manchester does not at once take the lion's share of the port traffic from Liverpool. But there are reasons, one of which when stated will sound very familiar to American ears. There are associations in Britain, among transportation interests, called shipping rings. A Royal Commission has been investigating them. During the first three days of the hearings a year ago Mr. Langdon, the chairman of the Manchester Chamber of Commerce, was on the stand, and testified that there is a conference of Liverpool steamship lines which gives rebates to shippers at the end of each six months, provided such shippers have not in the meantime patronized any vessel going to points served by ships owned by members of the conference. This rebate is large enough to make most of the shippers "be good." Further, "the cost of shipping goods at Manchester amounts to six shillings per ton (two shillings for cartage from warehouse to docks and four shillings ship canal toll). The cost of sending these goods by rail to Liverpool and putting them on board is ten shillings and three pence. The ships in the conference are compelled to charge the latter sum, whether the goods are shipped at Manchester or Liverpool. There is, therefore, no inducement for them to come to Manchester." (Quoted from a paper on the Manchester Ship Canal, by Prof. J. McFarlane of the Victoria University of Manchester, 1908.)

So for many reasons it has been a slow business to build up a port where there was no port before. When at first the ships owned and trading at Liverpool would not come to Manchester, the merchants of the city built ships of their own and established lines to America and Africa and South America, and the venture was a success. There are now seventy large steel steamships owned by the Manchester merchants plying from the home port.

There is nothing else in commerce so inert as the place of a market. The cotton market is in Liverpool, and there it stays, though the spinning is done in the Manchester district. It is only individual spinners' orders that come to Manchester. But other markets are coming. The port is now the first mineral oil market in the kingdom. The tropical fruit, grain, lumber and paper stock markets are growing rapidly. The following tables showing growth in the traffic of the port will be valuable:

## Weight of Merchandise Passing Through the Ship Canal*

| | Tons. | | Tons. |
|---|---|---|---|
| 1894 | 925,659 | 1901 | 2,942,393 |
| 1895 | 1,358,875 | 1902 | 3,418,059 |
| 1896 | 1,826,237 | 1903 | 3,846,895 |
| 1897 | 2,065,815 | 1904 | 3,917,578 |
| 1898 | 2,595,585 | 1905 | 4,253,354 |
| 1899 | 2,778,108 | 1906 | 4,700,924 |
| 1900 | 3,060,516 | 1907** | 5,201,500 |

*Manchester Guardian, December 31, 1907.
**Partly estimated.

## Manchester Ship Canal Revenues

(In half years.)

| | £ | | |
|---|---|---|---|
| 1894 | 44,308 | 1901 | 146,508 |
| | 53,593 | | 163,009 |
| 1895 | 63,037 | 1902 | 166,603 |
| | 74,437 | | 191,888 |
| 1896 | 81,214 | 1903 | 189,422 |
| | 101,116 | | 207,603 |
| 1897 | 97,330 | 1904 | 198,548 |
| | 107,334 | | 219,495 |
| 1898 | 105,865 | 1905 | 208,745 |
| | 129,530 | | 241,691 |
| 1899 | 124,183 | 1906 | 233,176 |
| | 140,592 | | 265,661 |
| 1900 | 141,346 | 1907* | 248,333 |
| | 149,484 | | |

*First half year.
From Manchester Guardian, December 31, 1907.

The annual income, which has crept steadily up to about $2,500,000, shows in its very regular increase a comfortable promise for the future. Viewed as a stock company merely, it must be considered a success. It is carrying its load, including a sinking fund, and with this year hopes to begin payment of dividends on common stock. It has accomplished very great and permanent reductions in the freight charges for the traffic of the region. There are no two opinions about its success among the people of Manchester. The Manchester Co-operative Wholesale Society stated officially before the canal had been in operation eight months that their subscription of $100,000 had been very nearly recovered by the savings in freight rates. This company had an annual turn-over in 1907 of $470,000,000, and in each semi-annual report writes off a very large sum as saved by the canal.

Two other specific cases will be valuable as object lessons for the merchants of Chicago. The paper mill of Chadwick and Taylor was doing business in Manchester before the canal came. They paid 7-6 per ton on paper pulp via Liverpool. Now they pay 3-6, a saving of 4-0, or $1.00 per ton. They used in 1907 43,000 tons of pulp, and have used an average of 25,000 tons per year for the fourteen years the canal has been in operation. They have saved in this time, because of the canal, $350,000.

Rylands & Sons, one of the large local firms in the manufacture and sale of cotton goods, have estimated that in the first three years the canal was open their saving in freight charges was $95,000. At this rate this one firm has saved since the canal has been in operation $1,330,000. And there are many such cases.

It would be very interesting to compute what the merchants of Chicago would save by the establishment of a ship canal to the sea, by way of Erie canal, or Montreal or New Orleans.

## The Tyne Ports

At the extreme northeastern end of the rich coal-bearing English midlands the river Tyne invites a series of harbors, chief of which is Newcastle, one of the oldest ports in Britain. The river has always been famous for its export of coal, though now it is surpassed in this regard by Cardiff. Most of the coal goes to the other ports of Britain and of Northwest Europe. The river has the sinuosities of old age entrenched in a fairly resistent sandstone, and a recent slight crustal depression has partly drowned the young valley. The Tyne is about the size of the Chicago river, the channel being only 250 feet wide at Newcastle, though it widens to 700 feet at Shields harbor, near the mouth. The effort to make it a harbor fit for a rapidly growing traffic has in it some good lessons for us at Chicago.

In 1850, as a result of a general agitation in Britain for the improvement of ports, a parliamentary act transferred the conservancy of the Tyne from the city of Newcastle, where it had long been vested, to "The Tyne Improvement Commission," which was a public trust, though differing in some critical points from the more successful later trusts on the Mersey and the Clyde. Without going into the history of it, the trust in its present form consists of 32 members, derived as follows:

*Two life members* selected by the Board of Trade of Newcastle.

*Fifteen members* elected annually from the various municipal corporations on the Tyne, as follows:

6 from Newcastle.
2 from Gateshead.
3 from Tynemouth.
3 from South Shields.
1 from Jarrow.

*Fifteen members,* elected tri-ennially as Dues Payers' representatives:

5 by the Coal Owners.
5 by Ship Owners.
5 by Traders.

This on the face of it gives the balance of power to business interests directly involved in the harbor, rather than to the more general municipal interests of the towns. But there are further conditions which put it peculiarly into the hands of the business interests, for it will be observed the representatives of the towns are elected annually, and hence are subject to rather rapid change,

while those representing business interests direct hold office for three years. But there is a further very curious advantage given to the business interests in the privilege of plural voting. In the requisites for dues payers' electors, it is provided that every coal owner shipping coal, coke or cinders during the preceding year, in respect of which Tyne dues have been paid, shall have one vote for the first 10,000 tons, and one vote for each additional 25,000 tons up to a maximum of 18 votes. Every registered ship owner has one vote for the first 100 net register tons upon which dues were paid during the year, and one vote for each additional 250 tons up to a maximum of 18 votes. In a similar fashion, traders are allowed votes up to a total of 18. At an election of members to the commission, an elector may vote for as many candidates as are necessary to fill vacancies, casting all his votes or any part of them for any candidate he pleases.

It will be seen that by this process members are chosen by *business* rather than by business men, and that it would be a very simple matter for large interests to override the many small interests in the choice of representatives, and in the policies of the commission.

The Tyne Improvement Commission has jurisdiction over the river from the piers at the mouth to a point inland 19½ miles, or about 9 miles up beyond Newcastle. But, unfortunately for the commission, it has not a monopoly of the business of the port, as is the case on the Mersey and at Manchester. In fact, their interest in docks and wharves is a minor fraction of the total facilities of the river. The North Eastern Railway alone has port facilities greater than the entire equipment of the commission. This divided interest in the river has been an extremely hard matter to handle, and the wonder is that the river has been so well developed. The Tyne is a crooked river, winding between high banks, and it has had to be straightened and dug out bodily at very great cost. This expense has fallen entirely on the commission, without help from city or nation, though the benefit has accrued to all the private docks and other properties along the river. Since 1850 about $85,000,000 has been spent on the harbor, and this almost wholly in making and maintaining a channel, very little for docks or other construction.

The gross receipts for 1907 were £437,254, or about $2,000,000, derived largely from dues of one kind or another; river tonnage, ballast dues, bridge dues, coal and coke export dues, harbor lights, buoys and beacon dues, mooring dues, Tyne pier's dues, etc. The net register tonnage of all vessels, coasting and oversea, cleared outwards in 1904 from the Tyne ports was 8,641,341, which places

the river fourth in the list of British ports. The population of the Tyneside towns has risen from about 190,000 in 1851 to 600,000 in 1901, and the whole region is growing rapidly, new industries springing up on every hand.

The river in its size and curves and character of improvement needed reminds us very much of our own local situation. But the expenditure of over $2,000,000 a year on harbor maintenance, by a population only one-fourth that of Chicago, should be food for thought. They have the bridge problem, too. The old high-level or Stephenson bridge has head room for ships of 83 feet in the clear, and the new King Edward VII. bridge has the same. Close below the Stephenson bridge is a low-level swing bridge. But few large boats go above these bridges, and this one swing bridge is the last bridge toward the sea. There has been clamor for bridges lower down, and the commission has established ferries to serve the wish for crossings. North and South Shields, being beaten in Parliament in an effort to get a bridge near the river mouth, got a permit for a tunnel, but nothing further has been done and it is believed that the time will expire and the permit lapse with nothing done. There is now an agitation on for the municipalities to take over the ferries and the commission is quite willing it should be done.

Another point of interest for Chicago is in the piers at the river mouth, which advance out three-fourths of a mile to sea, compelling the 15-foot tide to keep the bar clear to a 30-foot depth at low water. These sea walls are carried out to the 50-foot depth, are made of great concrete blocks laid in cement, and carry a railway track and 130-ton cranes for use in construction and repairs. The channel in the river provides 30 feet at low water up to Albert Edward dock, and 25 feet up to the swing bridge. There has been a steady decrease in the number of vessels entering the Tyne from 19,663 in 1865 to 12,935 in 1907. But the average size of vessel has grown from 205¾ net register tons in 1865 to 698 1-5 in 1907, and only two vessels in 1907 were over 5,600 net register tons. That is, the entire traffic of the Tyne is carried on in boats of an average capacity comparable to those in service at Chicago, while the large ore boats coming to the Calumet have twice the carrying capacity of the largest vessels in service on the Tyne.

Still another point of great interest to all of us in America is that not only does a community with only one-fourth the population of Chicago spend over $2,000,000 a year upon its harbor, but its Harbor Commission cares for human life, and the head men are quite as proud of the provisions for safeguarding human life as they

are of their engineering successes. The commission has had the courage also, and far-sighted good sense to make provision for pensioning retired officers and employes, and provide for the families of those sacrificed by accident. And they reap the pleasant benefit from it of a devoted and efficient service by all employes.

## The Port of Bristol

The river Severn and its valley provide a highway from the southern apex of the coal-rich English midlands to the Bristol channel at the southwest. The export and import traffic of the very rich region of Birmingham is sought by Bristol, with advantages which may outweigh the claims of Hull or Liverpool and Manchester. Bristol is also a gateway for the Thames basin, and the great market of London. In addition to these reasons is the very great advantage

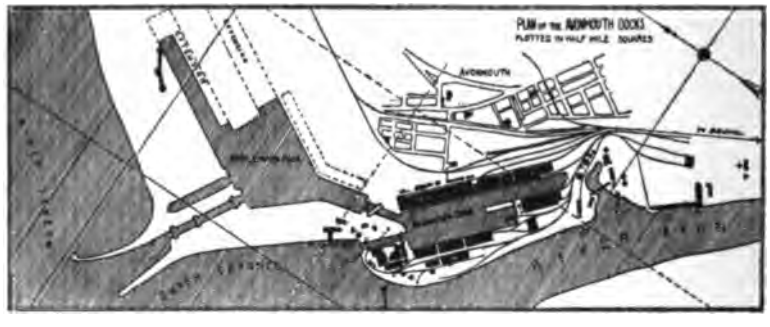


**Fig. 9. Plan of the Docks at Avonmouth.**

of being on the most direct and shortest route to the great American ports. These articles of advantage are being said over like a creed by the good people of Bristol, and with the courage of their convictions they are making splendid provision for the trade which must and will come.

Bristol for a thousand years has been one of the most famous ports of Britain. It was from the wharf at the foot of the main street that John and Sebastian Cabot set sail to discover the new world. During the palmy days of the slave trade Bristol merchants amassed vast fortunes and acquired a practical control of the rich traffic of the West Indies. There are yet today great sugar and cocoa factories which were started in those old days. But the town of Bristol is six and one-half miles up the little river Avon, a river smaller than the Chicago river. And when last century the ships

began to grow large by the introduction of steel and steam, the port of Bristol did not make provision for the larger craft, and her trade dwindled. With a river so small and a tide so high—there is a tidal range of 40 feet in the Avon—it was out of the question to dig the river deep enough to bring the great ships up to Bristol. A private company in the seventies built docks at the mouth of the Avon, and the city recently in self-defense got a new Act from Parliament to extend their powers, bought up the docks at Avonmouth and began to plan for facilities adequate for the largest vessels on the ocean.

It is worth noticing that it is the city government that has been the actor in the case of Bristol. The port is handled as a municipal monopoly—the best case in the kingdom, though there are in Britain twenty-one other cases of municipal monopoly, and sixty-seven cases in which city control is shared with state or private interest. At Bristol the ownership of all docks, quays, sheds, warehouses and other property is vested in the Lord Mayor, Aldermen and Burgesses of the city of Bristol, and the management of the estate is vested in a committee of nineteen members of the city council. This committee, with very able assistance of a permanent corps of administrative officers, a secretary and general manager, collector of dues, engineers and assistants, traffic manager and harbor master, carry on the entire business of the port—construction and maintenance, warehousing, and the handling of all sorts of freight on the water or on the quays, and on the railway tracks of the estate.

At the docks in the city of Bristol much of the quay frontage and shed room is rented out on leases, some for 999 years, as in the case of the Co-operative Wholesale Company. At Avonmouth, however, the purpose is to keep and operate the port facilities as a city business. It is the city that handles the grain and tobacco and meats into warehouses, and who handles the freight cars to and from the quays and the tracks of the great railways outside the dock estate. Since the completion of the newest dock, the Royal Edward, the railway companies pay the city for this switching 3d per ton for goods of Classes A, B and C, and 9d per ton for Classes 1, 2, 3, 4 and 5. The city has on the dock estate 43 miles of railway and ten locomotives.

The quality of construction done by the city is a very valuable object lesson to us. Everything is of the very best and most durable possible. The warehouses are of brick or of ferro-concrete, and are architecturally pleasing. The new tobacco warehouse is of ferro-concrete faced with vitrified brick, 200x100 feet, walls at bottom 3

feet thick, floors and roof supported by posts about 15 feet apart. The building is nine stories high and basement, and it is absolutely fireproof. The two tobacco warehouses hold about 25,000 casks of tobacco. The new grain elevators are similarly built, placed 200 yards from the dock, and served by endless belt conveyors through tunnels, so half a dozen vessels can be loaded or unloaded at once. The new Royal Edward dock just dedicated by the King in July last, is a magnificent structure. It is large enough to accommodate half a dozen great liners at once, but is only the first and outer dock in what is hoped will be a long series of docks running eastward along the foreshore of the Severn estuary. The tidal range of 40 feet requires a dock wall and gate over 80 feet deep, in order to admit the largest ships at any phase of tide. The walls are of concrete, faced with vitrified paving brick and coped with Norwegian granite blocks pointed and keyed with lead. Such construction is planned for a thousand years. There is no finer anywhere. It makes one hang his head for the shabby and shoddy stuff we line our rivers with.

The present population of Bristol is only a third of a million. They have borrowed for harbor improvement since 1848, £4,988,-650, or nearly $25,000,000. Their income from the business of the port in 1906 was $1,137,067, upon a net register tonnage of 2,112,-907, the increase in net tonnage since 1850 being nearly 400 per cent. Upon the above obligations the dock estate has been able to pay 4.16 per cent, but now the city obtains its loans at 3.5 per cent, and the dock estate pays that and lays by a sinking fund as required by statute. In case the expenses are not met by the revenue of the dock estate, the deficit must be made up from the fund raised by general taxation. But very slight call has been made upon the pockets of the citizens so far. In all my tour of a score of the world's great ports I found nowhere more earnest zeal for the development of the port and the city than was in evidence in Bristol. The whole community moves as one man, and at a pace and with an earnestness and wisdom that must succeed. Bristol now has a first-class harbor. Her next great problem lies in enlisting the whole hearted support of the railways in her hinterland. As in the case of Boston and Philadelphia, her problem is one of establishing fair relations with the systems of transportation on her landward side.

# The Scottish Lowlands

The lowlands of Scotland have in all periods of history been the wealthiest and most densely populated part of the country. They have a flat surface and rich soil, and they have also almost all of the mineral wealth of the country—a considerable deposit of coal, oil shale and iron—and because of this the bulk of the manufacturing industry. The area is not large, it is only 42 miles from Glasgow to Edinburg. And since the minerals are most largely on the west slope, Glasgow is the metropolis and port.

## The Port of Glasgow

It is rather striking to notice that Glasgow, though one of the world's great industrial and commercial cities, is the focus of an area of not much over 25 miles radius. It is the only large city in the region and in its growth and the character of its institutions reflects not only the wealth of natural resources, but also the sterling quality of the population making use of the natural advantages.

In organization and administration of the port we find in Glasgow several of the features familiar at Liverpool and Newcastle. The port was managed for generations (1611-1825) by the magistrates and town council. Various changes were made in the form of organization during the next generation, and in 1858 an act was passed establishing a Port Trust, which has held up to date and which is interesting as combining without the trust idea an intimate and increasing municipal interest. Since the most of the modern port development was done by the trust as organized by the act of 1858, it will be instructive to record the form of organization therein provided. The trust was administered by an incorporated body of twenty-eight trustees, who gave their services gratuitously, consisting of:

The Lord Provost of Glasgow (the Mayor).

Fifteen members representative of the shipping, mercantile and trading interests of Glasgow, viz.:

Two chosen by the Chamber of Commerce.

Two chosen by the Merchant's House.

Two chosen by the Trades House; and

Nine elected by the ship owners and harbor rate payers.*

The Merchant's House and Trades House are associations of guilds handed down from the middle ages, both bodies exercising a

*Handbook of Industries of West Scotland, article on Clyde Navigation, by T. R. Mackenzie, General Manager and Secretary to the Clyde Navigation, Glasgow, 1901.

very powerful influence in the local social and industrial activities. The body as thus incorporated and known as the "Clyde Navigation," has given us the modern port of Glasgow. It has created a harbor out of grain fields and pastures. Where almost within the memory of living men the Clyde could be forded, is now a channel admitting vessels of 28 feet draft. To accomplish this the bed of the river has been lowered between 24 and 28 feet for nearly 20 miles, and this has required a dredging in the last seventy years of over 72,000,000 cubic yards of material. The trust has been always a very efficient business organization. The port is not worked for a profit. The Clyde trustees are the only navigation authority within the port. Their powers include (a) deepening, widening and straightening the river; (b) its lighting and buoying; (c) the construction of docks; (d) the borrowing of money for works, and (e) the levying of rates on all vessels and goods. There has never been any municipal or national guaranty rates or assistance of any kind.

Since the Clyde for 18 miles is either actually or potentially a harbor, towns down below the limits of Glasgow have become interested in harbor facilities, and after much agitation for representation in the trust, an act was passed by Parliament in 1905 raising the number of trustees to 42 to be chosen as follows:

Twenty-four chosen members:

10 by the Corporation of Glasgow.
2 by the County Council of Lanark.
1 by the County Council of Dunbarton.
1 by the Town Council of the Burgh of Govan.
1 by the Town Council of the Burgh of Partick;
1 by the Town Council of the Burgh of Dumbarton.
1 by the Town Council of the Burgh of Renfrew.
1 by the Town Council of the Burgh of Clydebank.
2 by Chamber of Commerce of Glasgow.
2 by Merchant's House of Glasgow.
2 by Trades House of Glasgow.

Eighteen elected members: Elected by ship owners and harbor rate payers (the electors being those paying £10 of rates in the year preceding the election).

So though the Clyde Navigation is still a trust in form, the manner in which the majority of its members are now chosen makes it a municipal body, though not looking to the municipalities for any financial support. It distinctly lacks the simplicity and independence of the Mersey Docks and Harbour Board. Enterprising public-spirited business men regret the increase in number of trustees. The body becomes too unwieldy. It is too easy for a member to find an

excuse to stay away. They feel also that it is a mistake to have members chosen to represent so many towns and other interests, and that the port suffers from the inertia of such a body; and from the fact that one who represents one of the lesser towns will take notice when the interests of his town are discussed, but lacks interest in the general welfare of the port.

Unlike Liverpool and many other port authorities, the Clyde Navigation does no warehousing, handles no railway cars nor lighters, and its sheds are used only for goods in transit. So its earnings on the same amount of traffic are less than at Liverpool or Manchester. Nevertheless, it earns a very commendable income, and its record is extremely creditable. The following table shows the growth in income since 1860, rising in 1907 to almost $3,000,000.

**The Clyde Navigation Total Revenues, 1860-1908**

(From Clyde Navigation Annual Statistics, Year Ended June 30, 1907.)

| | | | |
|---|---|---|---|
| 1860 | £ 97,984 | 1890 | £356,203 |
| 1865 | 121,588 | 1895 | 353,813 |
| 1870 | 164,093 | 1900 | 441,420 |
| 1875 | 196,327 | 1905 | 513,548 |
| 1880 | 223,709 | 1907 | 547,862 |
| 1885 | 291,658 | Or about $2,800,000 in 1907. | |

During 1907 the net register tonnage of vessels arriving at and departing from the port was 11,799,613. The tonnage of goods was 9,795,093, or just about the present lake traffic of the port of Chicago. From 1858 to January 30, 1907, the total capital investment in the improvement of the port has been £8,884,261, or in round numbers, $44,000,000. Bonds have been issued at various rates between 3 and 4 per cent and the trust not only pays the running expenses and this interest on investment, but sets aside a sinking fund as well.

The Clyde Trust faces the bridge problem, though up to date, bridges have been evaded. There are no bridges across the harbor, all of the shipping being accommodated below Glasgow bridge, the lowest bridge on the Clyde. But the trust supplies ferries at various crossings, and "cluthas" or passenger boats ply between ports up and down the river. The charges are very low, on the shorter ferries as low as one cent per passenger; in fact, the charges are based upon the bare cost of operation, there being no intention of making a profit. There are twelve ferries in the upper six miles of the harbor and in addition two subways, one being a part of a subway belt line for passenger service, but not much used.

*The port facilities* of the Cylde are of the best. The channel now provides 22 feet at low water and 33 feet at high tide. Berth-

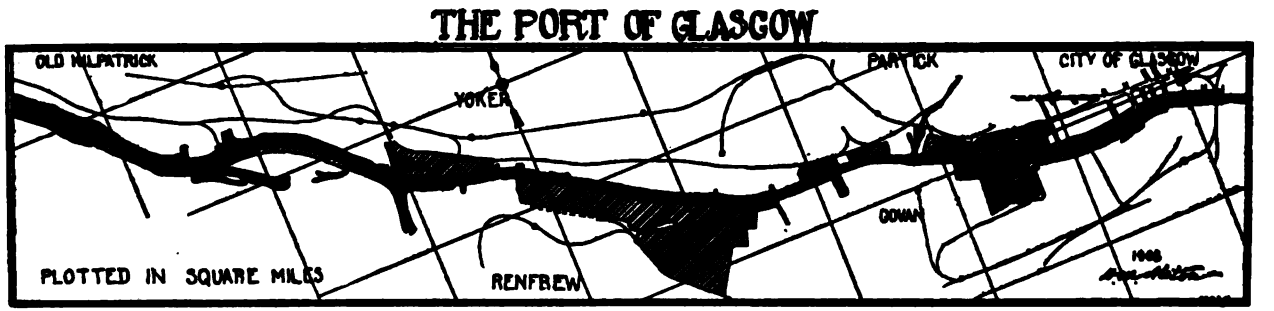



**Fig. 10. From Glasgow Bridge to Port Glasgow is 18 miles. The river the entire distance is available as a harbor. This map shows only the upper half of the river channel. The shaded areas are lands owned by the Clyde Navigation for port and commercial development.**

age is supplied on either bank of the river, 45 per cent of the total harbor, and in specially constructed docks or tidal basins 55 per cent of the total. The tidal range of eleven feet does not require the construction of expensive gates and locks. The total quay front in Glasgow is about ten miles. About forty ocean-going vessels can be accommodated with berth and sheds at one time. There are over fifty acres of floor space in the sheds. The sheds are modern, one and two stories high. Movable cranes are furnished on the quay, usually one railway track between the shed and the water.

All construction, as in most other British ports, is very substantial, of masonry and concrete mostly, and built for all time.

Inland transportation is almost wholly by rail. Nearly every quay is supplied with tracks, 22 miles in all, owned by the trust, and connecting with the railway systems of the hinterland. The trust has no cars or locomotives, and no charge is made for the use of tracks.

The story of Glasgow has much food for thought for us in Chicago. The development of the port made possible the development of the hinterland, and has invited great industries which otherwise could never have been established. This is notably true of shipbuilding. The coal of the region meets the ore of Spain and limestone of Wales upon the banks of the Clyde, and steel navies for all the world are born. The Lusitania, largest of ships, was built and launched upon the Clyde. Many of the boats for our own Great Lakes traffic have come from the yards of the Clyde. The record of tonnage built since 1860 shows us what we might be doing in Chicago:

**Tonnage of Ships Built on the Clyde, 1860-1907**

(From the Glasgow Herald, December 31, 1907.)

| | | |
|---|---|---|
| 1860..... 47,833 | 1876.....174,824 | 1892.....336,414 |
| 1861..... 66,801 | 1877.....169,710 | 1893.....280,160 |
| 1862..... 69,967 | 1878.....222,353 | 1894.....340,885 |
| 1863.....123,262 | 1879.....174,750 | 1895.....360,152 |
| 1864.....178,505 | 1880.....241,114 | 1896.....420,841 |
| 1865.....153,932 | 1881.....341,022 | 1897.....340,137 |
| 1866.....124,513 | 1882.....391,934 | 1898.....466,832 |
| 1867.....108,024 | 1883.....419,664 | 1899.....491,074 |
| 1868.....169,571 | 1884.....296,854 | 1900.....486,337 |
| 1869.....192,310 | 1885.....193,453 | 1901.....511,990 |
| 1870.....180,401 | 1886.....172,440 | 1902.....516,977 |
| 1871.....196,229 | 1887.....185,362 | 1903.....446,069 |
| 1872.....230,347 | 1888.....280,037 | 1904.....417,870 |
| 1873.....232,926 | 1889.....335,201 | 1905.....539,850 |
| 1874.....262,430 | 1890.....349,995 | 1906.....598,841 |
| 1875.....211,824 | 1891.....326,475 | 1907.....619,919 |

Last year's tonnage built on the Clyde is about 50 per cent greater than the total tonnage built in American yards in the same year, and is about two-thirds as great as all the shipbuilding in the world outside of Britain.

In many other lines of industry, as in textiles, a great growth has been possible because of the development of the port. "The extraordinary increase of population and industries adjacent to the harbor and river is a proof of progress. Our city population has doubled since 1863. Partick has grown from 12,000 to 65,000; Govan from 9,000 to 90,000; Renfrew from 4,000 to 11,000; and Clydebank has developed from green fields and ploughed lands to a town of 40,000 inhabitants." The population of the Greater Glasgow is now about 1,000,000, and as prosperous and industrious and alert and aggressive as any we can show in America; but with a vastly greater interest in the welfare of the average individual, and with a more conscious community interest in the solution of social problems of all kinds than can be found anywhere in America or than can be hoped for in the next generation.

## The London Basin

The rich farming lands of the south of England, especially those of the Thames basin, in the early centuries gave rise to the greatest population density and wealth in England, and the Thames estuary opening out toward the continent, fixed at London, as the head of navigation, the metropolis and most important port of the realm. When the Dutch supremacy on the sea was shattered in the seventeenth century, the importance of the British merchant marine and of the port of London rose at once to the first rank, an eminence still held, and only within a decade or so threatened by the rise of other nations and centers.

### The Port of London

London has always been a great entrepot, importing from all the earth the widest variety of goods, making the world's largest market from which by re-shipment world-wide markets of lesser rank have been supplied. A market thus established has the greatest tenacity, an inertia extremely hard for other rising ports to overcome. So it comes about that London now is the world's headquarters for wool, ivory, spices, rubber, tea, diamonds and various other articles of commerce. But in spite of market inertia, various

commodity headquarters, once in London, have been won to other ports. Liverpool now has grain, meats and tobacco, and New York and Havre take turns as headquarters for coffee. And it is inevitable that other markets will in time be lost, for London is not holding her own. The population of London, now about 7,000,000, increases with a rate and uniformity hardly equaled in any other metropolis, but the rate of growth of the commerce of the port is exceeded by New York, Antwerp and Hamburg. London today in net register tonnage stands below these three ports.

The far-sighted, public-spirited men of the port of London have watched this slowing up in the business of the port for the last decade. They realized that the condition is largely due to the method, or lack of method, of port administration. For London, like most of our American ports, is like Topsy in "Uncle Tom's Cabin," who "jest growed." As a consequence the administration of the port of London is the most complicated on record. Quoting from The Port of London; Minutes of Evidence 3343-4: "The chief authorities are:

"The Thames Conservancy: for the conservancy of the whole of the Thames, including the port, the area of its jurisdiction in the port differing in limits for various purposes;

"The Trinity House of Deptford Strond: for pilotage, lighting and buoying from London Bridge seawards;

"The City Corporation: for port sanitary purposes from Teddington lock seawards;

"The Watermen's and Lightermen's Company: in the business of lighterage and barge service;

"And many other authorities with statutory powers, which have to be taken into account, such as the dock companies and other companies, and several local authorities."

The Thames Conservancy is a governmental board with varied powers, extending over the entire Thames basin; "channel maintenance, regulation of navigation, supervision of all explosives and petroleum, the maintenance of all public moorings, the use of which are free to ships; the marking, watching and removal of wrecks and obstructions from the channel, the dredging of the river for the improvement and maintenance of navigation, the prevention of pollution." The Trinity House is likewise a government board, responsible for the lighting of coasts and harbors not locally provided for; it licenses and regulates pilots, examines all persons who

are qualifying for position of dock master, masters and mates of vessels. The Watermen's and Lightermen's Company is a vigorous specimen of the mediaeval gild, controlling the character of service, charges and personnel of the barge and lighter business of the port. The Corporation of London is at once the sanitary, police and fire authority of the port. It safeguards the port from entrance by way of the river of infection and disease brought in either by persons or goods."

In 1901-2 a Royal Commission made an exhaustive study of the Port of London, the result of which was the introduction of a bill into Parliament to unify and simplify the port administration. The need was urgent, but the problem of compromise or settlement with the multitude of conflicting interests in the port was too great, and the bill was defeated.

Another bill was introduced in the summer session of 1908, which has run the gauntlet of all the multitude of opposing interests and which in the closing days of the autumn session became a law. It is instructive to notice that after the deliberate and exhaustive study for a number of years of the port problem, the promoters of this bill have adopted practically the Liverpool plan of a public trust, of absolute freedom and undivided monopoly control over the port. The trust is composed of 24 members as follows:

Fourteen members elected:

By payers of port dues,
Wharfingers,
Owners of river craft.

Ten members appointed:

One by the Admiralty,
Two by the Board of Trade,
Three by the London County Council (members of),
Three by the London County Council (not members of),
One by the Corporation of London,
One by Trinity House.

This port authority is to elect its chairman and vice-chairman, who may, but need not be, members of the trust. The trust may pay the chairman, vice-chairman and chairman of committees any salaries it sees fit. The trust is given power to do the business of any dock company, and to construct and equip docks, piers, quays, sheds, warehouses, railways, etc., and all present dock companies' holdings are to be transferred to it. The trust may, on application to the

Board of Trade, be given power to acquire land for extension by purchase or otherwise than by agreement; to construct and equip and to charge to capital any such improvement. The values of all properties to be turned over to the trust have been appraised by competent disinterested parties and terms arbitrated where necessary. The result of this valuation is somewhat surprising. The nominal value of all docks is given as £24,000,000, and of the 320 wharves as £13,000,000, a total of docks and wharves of about $200,000,000.

It is most significant for us in Chicago that the best brains in Britain, after years of exhaustive study, have adopted the policy of having one powerful independent monopoly in charge of the business of the port. Private interests disappear, and the affairs of the port are to be managed as one estate in the interest of all the people doing business in the port; and with the intention not of paying the largest dividend possible, but of giving the best possible service, and paying an interest of only about 3 per cent on the actual capital investment.

*The London port facilities* are very extensive. The Thames is a harbor of rather excellent quality from London Bridge to Tilbury docks, a distance of 22¾ miles. At low water there is a channel at Tilbury 26 feet deep, falling to 14 feet at London Bridge. High tide adds 21 feet to these depths. In spite of this range in tide levels, there are 80,000 feet of quay in use on the river banks, and half the discharging of cargo of the port is done either at the riverside quays or in the open river. To serve this river traffic 62 tiers of water moorings provide berths for 121 ships, used by vessels up to 5,500 net register tons, and in addition there are 16 swinging moorings each for one vessel. Three thousand vessels per year use water moorings, and pay no port dues except the slight fee to the Thames Conservancy.

Vessels anchoring in the river or at any quay may be served by barge or lighter. These barges flock round a great steamer and take its cargo for delivery to any warehouse or quay on the whole water front of London harbor. There are over 10,000 of these barges in commission, ranging in size from 70 to 200 tons. They are small enough so they can go under the bridges and into the canals, and so they serve the upper river. The barge is the most characteristic feature of London harbor traffic. These barges are owned privately and pay no port charges whatever. Each barge is licensed by the Watermen's Company, and a small annual renewal of from $1.50 to $2.50 per year is charged on each owner's fleet. The river is lined

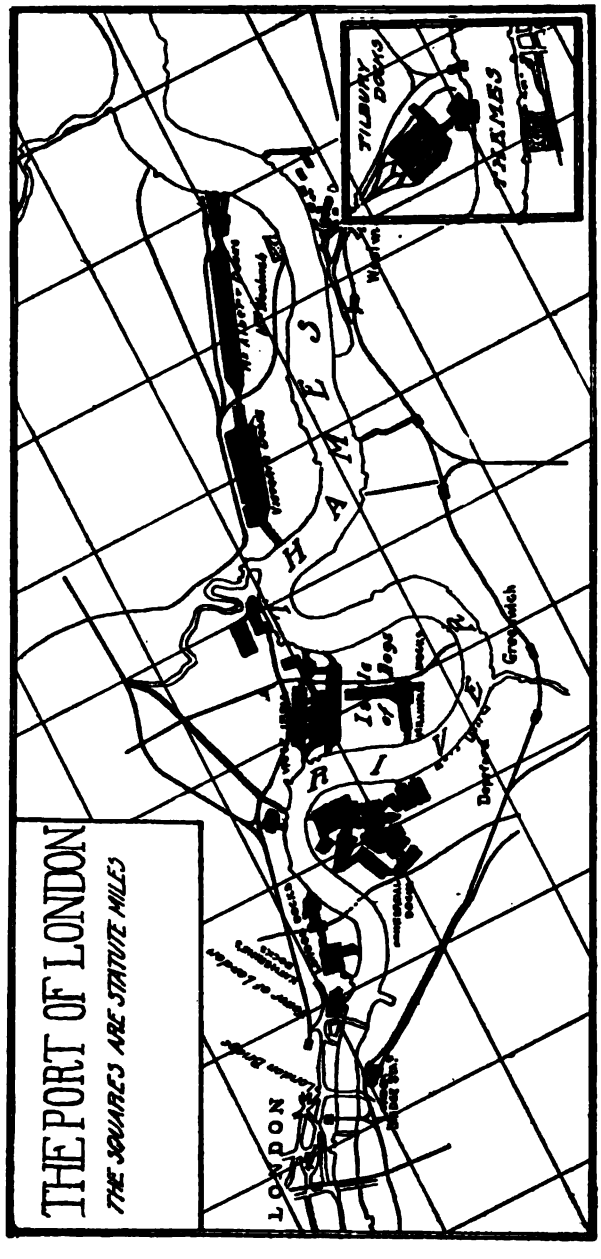



Fig. 11. It is 22 miles from London Bridge to the deep water at Tilbury Docks. All the river is available for harbor purposes, but only the part here shown is much used.

on both banks with warehouses and fringed with these barges at all times. When one has watched these busy lighters, taking goods from any part of the miles of river front to vessels anchored anywhere else, and seen the flock of barges round a steamer in midstream, ready to take the boxes, barrels and bales to any one of miles of warehouses anywhere in the port, the possibilities of such service in Chicago harbor between Calumet, the lake front and the river and canal loom large on the imagination, and one cannot escape the conviction that our city cannot do better than to give every consideration possible for the establishment of such facilities here.

About half the traffic of the port is handled in docks and basins, connected with the river by locks so as to maintain a constant level of water and to concentrate the handling of freight into a smaller area. Until the passage of the recent Harbor Act all the docks were owned by private companies, which also furnished the shed and warehouse service, but were not at all interested in shipping. About 80 per cent of the dock business was in the hands of one concern—the London and India Docks Company, owning nearly all the dock facilities north of the river. South of the river the Surrey Commercial Docks Company owned all the docks.

The London and India Docks Company controlled the dock situation in London. It owned 430 of the 640 acres of water in the London docks, and 106,000 feet of the total 143,000 linear feet of quay. The estate covered 1,800 acres, had 15,500,000 square feet of shed and warehouse floor space, capable of caring for nearly 1,000,000 tons of goods at a time. The best accommodations in the port for the largest steamers, the Tilbury docks, 22¾ miles below London Bridge, belonged also to this company. On the estate were 80 miles of railway, and the company owned and ran 30 locomotives to handle the freight cars.

On the whole, the docks and riverside quays of London are not well served by railway. The great bulk of freight is handled by barge or lurry. The newer docks, the Royal Victoria, Royal Albert and Tilbury docks, are well equipped with tracks, as a rule two tracks on the quay between the water and the shed, and ample switching yards back of the shed. Though the Thames is connected by canal with the network of canal systems of central England, canal traffic is not a large element in the business of the port. The canals of Britain are in nearly the same state of desuetude as our own canals and for about the same reasons.

One reason why the port traffic of London has not held its own

is to be found in the flow of freight from the west, which can come via Bristol, Southampton and other ports, and arrive many hours sooner by a short rail journey. That is, the London market is more and more being served by outlying ports. American meat, for example, is unloaded at Southampton directly into the delivery wagon, and this loaded wagon is carried on the freight car ready to hitch the horses to in London—so saving one or two handlings and several hours of time. And this is a kind of competition which is inevitable. It is a geographic advantage which Southampton and Bristol ought to reap. Incidentally, it is a case of competition between railways and established water routes, the development at Southampton being due almost entirely to the initiative of the London and Southwestern Railway. In similar case, whatever may be done at Bristol is again a question of the co-operation of the great railway systems between Bristol and London.

## Southampton

Southampton is thus rising in prominence in proportion as the port service of London markets is cheaper or more efficient than the trade up the Thames estuary direct. The significance of the port lies almost wholly in the fact of its being a gateway for London. It is very advantageously placed as a port of call for vessels to and from the ports of Northwest Europe. Mails from America are landed here for London and the east of England. So for very good reasons the business of the port is expanding. But its importance is always to be limited by the service it can share with Bristol, Plymouth, Harwich and others as a gateway for London.

The London and Southwestern Railway owns and operates its own docks, quays, sheds, warehouses and railway trackage. As to efficiency of management and quality of facilities offered, there is no question. There is evident here again the very great advantage in a practical monopoly of the business of the port, as is so patent at Liverpool and Manchester, with some obvious additional advantages for the attraction of traffic, such as a fusion of port dues with the through railway rates to London, in such a way as to make the through rate more attractive to the shipper than he might get by dealing with an independent port authority and the railway company individually.

## The Welsh Coal Field and Its Port

On the south flank of Wales where the paleozoic strata dip off under the estuary of the Severn, are found the richest coal deposits and the best quality of coal of all Britain; coal superior to most of

the West Virginia product and ranking next in quality to our best anthracite. This coal is in demand as steam coal over all the earth, and it is no exaggeration to say that the Welsh coal is burned in every port under the sun. This coal is the one product in a very limited hinterland, which is responsible for the rise of Cardiff, the largest coal-shipping port in the world, and the place where greatest progress has been made in the business of handling coal.

## The Port of Cardiff

The Port of Cardiff is the best case in Britain of an exclusively private development. The entire port and all its business is almost exclusively the work of one corporation, practically of one man, the Marquis of Bute. This man, owning very extensive coal deposits in the hills back of Cardiff, established this port in order to ship his coal. Docks were built and a railway to serve them, and being defeated in Parliament in an attempt to get his own railway line back to his coal lands, his road was made a terminal railway company, the Cardiff Railway Company, of which the Bute Docks Company is a part. Seven different railway systems have lines to the docks and the major part of export coal from South Wales goes from this port, constituting about nine-tenths of the export tonnage. Because of this shipment of coal the port of Cardiff ranks third in Britain on the basis of tonnage, while on the basis of value of imports it ranks seventeenth. But in the one great business of handling coal the efficiency of management is unrivaled. Not only do they handle coal at a faster rate than elsewhere in Britain, but they load it with less waste from breakage than anywhere else on earth. A Cardiff invention called the Lewis-Hunter system is in use. The average carload of coal is 10 tons. The car is picked up bodily by a crane, and its load slides out one end into a square steel box or cage, which holds it easily. This cage is then swung over the coamings and to the bottom of the hold of the vessel. The bottom of the cage is a four-sided cone, supported from the apex by a rod which passes up through the coal to the cable of the crane. The box is lifted away from the bottom, allowing the coal to slide out on all sides, the bottom later being pulled up through the coal. The least possible breakage ensues, the coal trimming itself, and distributing the "small" evenly through the hold.

As at Bristol, the tide has a great range, in this case of 36 feet. So all docks must be provided with locks and gates, enormously expensive, and even then vessels may not come in at low tide. The

harbor has a water area of 161¼ acres, not counting certain pools for the storage of lumber, and a total quay length of 6¼ miles.

The Dock Company has an absolute monopoly of the port, furnishes its own light and hydraulic power, lights and buoys the port, has a railway trackage for 20,000 cars at a time, and sheds and warehouses, including cold storage for an extensive trade. The Cardiff Railway Company is capitalized at $35,000,000. A single dock of recent construction, the Queen Alexandra, cost $11,250,000.

## The Paris Basin

Analogous to the basin of the Thames, and like the opposite page of an open book, lies the rich valley of the Seine river, with Paris at its focus.

## The Port of Havre

The natural gateway to this populous and wealthy basin is Havre, the first seaport of France, on the right bank of the Seine at its mouth, standing in the very edge of the deep and unobstructed English Channel. No port on the Continent of Europe has so fine a position for the trade of the world, and the wonder is that it has not developed faster. Napoleon recognized its significance and is

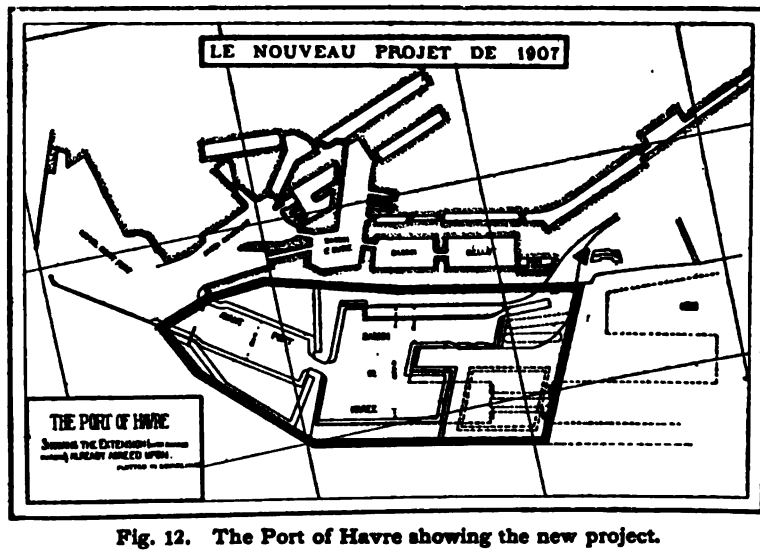



**Fig. 12. The Port of Havre showing the new project.**

quoted by the Normans with pleasure: "Paris, Rouen and Havre are one city, and the Seine is the principal street." It is in the direct path of the ocean liners from the North Sea to America, the most natural focus for the trade of west central Europe.

Inquiry discloses that Havre has lagged behind Antwerp and other North Atlantic ports because of the most clumsy method of harbor administration ever devised, instructive to us in America as a condition to be avoided. It is the French plan, and applies to all her harbors equally. The public-spirited men of Havre have watched the increase in the size and demands of modern shipping, and the splendid growth of rival ports, knowing all the while that the fault lies in the French system, which has lodged too much power in the state authority, and that a sensible organization of port authority could put Havre where she rightfully belongs in the front rank of the world's greatest ports. When the Chamber of Commerce of Havre started a strong agitation in 1882 to get an enabling act for adequate harbor facilities to keep pace with the demands of commerce, the effort was rewarded with the desired act in 1895—thirteen years merely to get the act.* Then by the cumbersome method of distributed responsibility and divided authority, it has taken another thirteen years to get as far along as the Mersey Docks and Harbor Board may get in a two hours' session.

And it is not to be wondered at that time is consumed, and plans obsolete before a spade is turned. The proposition for the harbor extension now in construction went from office to office between authorities, and back and forth twenty-five times! If there were no opposition, every one anxious for it and pushing it, this gamut would require eighteen months as a minimum.

Then, too, the situation is all the more deplorable that the city must raise about 78 per cent of the cost of an improvement, though the city interests have no power in choice of plan or method of construction, and in the administration of the finished harbor only fragments of power and these compromised by the state supervision. Here is a world's record for divided authority:

1. Minister of Marine has:
   - (1) The pilot service, and
   - (2) The police for mariners and ships in part.
2. Minister of Public Works:
   - (1) New works under engineers of "Ports et Chaussees,"
   - (2) General policing of the docks, and
   - (3) Equipment and lighting of the docks.
3. Minister of the Interior:
   - (1) Sanitary service, and

*"Exploitation et Administration des Ports Maritime." Rapport presente (to the Havre Chamber of Commerce) par M. Maurice Taconet, au nom de la commission de l'autonomie des Ports. Havre, 1905.

(2) Policing the quays, and
(3) Lighting the quays (city expense).

4. Minister of Finance:
   (1) Collection of dues and fees,
   (2) Interpretation of tariffs,
   (3) Regulation of hours of loading and unloading.
5. Minister of Commerce:
   (1) In everything undertaken by the Chamber of Commerce; in the mechanical equipment; sheds and warehouses, etc.

So there are three sets of police, with constant invitation to friction, very slow of settlement; two harbor masters and sets of harbor rules and regulations; and the rights of the city, and *its* interests always to be settled by bureau officials in Paris.

Havre has now the coveted legislative permission to enlarge her harbor and bring it up to modern requirements. Much good work has been done since 1900, and the result of it is shown in a very rapidly increasing tonnage. In 1900 the net register tonnage was 4,400,000, and had been almost at a standstill for two decades. In the seven years since then the net register tonnage has doubled, standing now at 8,837,000. In this interval only New York and Antwerp in all the world show a slightly more rapid growth.

The harbor enlargement is undertaken in the face of the serious physical handicap of the drifting sand of an estuary opening wide to a tidal range of 25 feet. But Havre is placed at the extreme southwest point of the north shore of the estuary, and has built a great mole out into the teeth of the sea, which provides the entrance on one side of the delta, and hence easily defended from the drifting sand. The work was begun in 1896, and was to have been finished in eight years, but for reasons above indicated, the construction is delayed, and it will be some years yet before it will be finished.*

This extension as now provided for, will more than double the accommodation of the harbor, and will provide berths and turning basins 2,800 x 2,000 feet, and with a depth which will care for the largest vessels we have any reason to look for within a century. The harbor entrance and great basins are added by reclaiming the shallow foreshore of the estuary, and this has been so planned as to make this entrance lead on into new additions to the harbor to be in turn won from the estuary farther eastward as the need may arise. The one unit of new work now in creation, will cost, just

*Brindeau, Louis, "Le Port du Havre; Son etat actual; le Nouveau Projet; Le Havre, 1907."

sea wall, channel and basins alone, without sheds or equipment, the round sum of $17,000,000. In ten years according to present plans, the largest ship on the sea can come to Havre at any stage of tide.

Next to an inert central government, the merchants of Havre have been handicaped by a stubborn, privately owned railway, the Western Railway Company. As in so many other places the natural expansion of the city has been subject to the whim of railway management, remote and not actively interested in the development of the city. For some years the purchase of the railway by the general government has been contemplated, and in this time scarcely a sou has been spent upon it to improve the service or advance the interests of its patrons.

The new work now partly finished, provides an outer harbor of 175 acres with an entrance 656 feet wide, approached by a channel 984 feet wide, and with a minimum depth of 29 feet 6 inches. There are 10 inner basins with a combined water area of 200 acres, and with 40,500 linear feet of quay.

The construction of docks, quays, and sea wall is of the highest order of excellence; cut stone, brick and concrete being the materials used. One of the finest lines of transatlantic vessels, the French Transatlantic Company, has Havre as its home port, and their new terminal where passengers are landed is the finest in existence. The building is two story, the first floor being devoted to freight, the second floor to passenger service. The shed is of steel and concrete. Passengers land under cover, into waiting rooms finished in mahogany and leaded glass, and with every necessary convenience; rest rooms, writing and reading rooms, service rooms, telegraph and telephone; a very inviting place.

The warehousing in this port is carried on by a private monopoly, working under permit and supervision of the city. The newer sheds are of brick and iron, rather frail looking, but well served with traveling cranes along the quay, and with railway tracks front and rear. One gets the impression that most of the goods are handled across the quay by dray, or "le camions," as they call it.

The long neglect of the harbor of Havre reminds us of our own case in Chicago. The plan so successfully carried out of making a magnificent harbor by reclaiming as much as they choose of the shallow estuary off shore, is very significant and instructive in view of our own need and opportunity on the lake front. Havre has now a population of only 130,000. Since 1831 there has been spent upon the harbor over $42,000,000, three-fourths of which has

been raised by the city. The heroic efforts and success of the business men of Havre to win harbor success from a sluggish and indifferent bureaucracy and against the deadening influence of an antagonistic railway monopoly in the hinterland, should give us inspiration for our own harbor problem.

# The Valleys of Germany and Their Ports

Germany has a population of 60,000,000, Switzerland of 3,300,000, the Netherlands of 5,500,000, and Belgium of 7,000,000. These people occupy the central part of the northwest slope of Europe, a rich agricultural region, rich also in coal, iron and other minerals, and hence rapidly developing as manufacturing communities. The rivers Schelde, Rhine, Weser and Elbe are the chief natural highways of this slope, and the river mouths have thus become the foci of a great and increasing international trade. Three of these centers, Antwerp, Rotterdam and Hamburg have within a generation, become commercial ports of the first rank, and it will well repay us to look with some care into the reasons for this rapid growth.

## The Port of Antwerp

Belgium is one of the richest maufacturing regions of the world, the industries growing out of the service of the coal deposits of East Belgium. Through this rich area the river Schelde leads northward to the North Sea, where Antwerp at the head of deep water navigation has become the second port of the world as measured by net register tonnage. A network of canals connects the Schelde with the Seine, Meuse and Rhine, and leads the freight to and from a rather wide hinterland. In addition to this there is excellent railway connection to the coal fields and the Paris basin at the south and to the rich and populous manufacturing region at the Ruhr coal field on the middle Rhine.

The valleys of the Meuse and Rhine lead much more directly to Rotterdam and for this reason Rotterdam is a close and active rival of Antwerp as a gateway of West Germany.

*Administration.* Antwerp is very fortunate in the organization of port administration and we will discover that much of the recent growth of the rival ports of west Europe is due to the wisdom and singleness of purpose of the port administration. The case of Antwerp is that of municipal monopoly, though a small part of the river front is owned by the state.

The city council of 39 members, presided over by the Burgo-

master (mayor), is the highest authority.* The council chooses from its own number a harbor commission of five members, of which the Burgomaster is the chairman. In this commission there are secretaries of commerce and public works. The state undertakes the policing of the port, lighting and buoying, the ferries, and the collection of dues. To facilitate the smooth running of the port

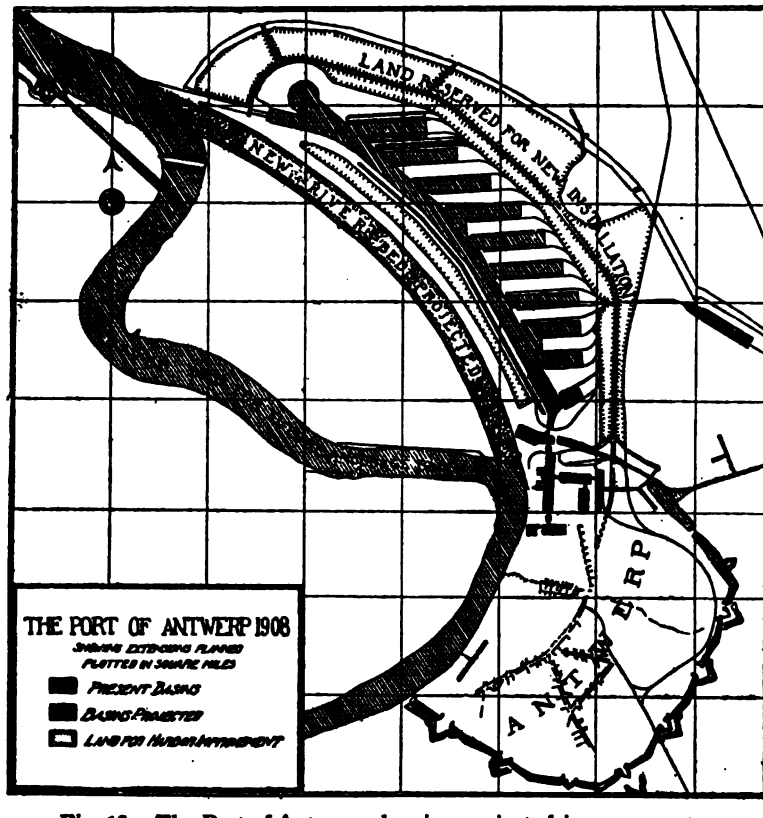



**Fig. 13. The Port of Antwerp showing projected improvements.**

a special consultative commission is formed, consisting of five state officials, two city officials, and two members representing private interests, as follows:

From the state:

Director of Railways of the Antwerp district,
The Chief of the Railway Freight Terminals,
The Local Engineer-in-Chief of Roads and Railways,

*Notice sur le Port d'Anvers (by M. Ferd. Kinart, Chief Engineer), Brussels, 1905.

The Director of Pilots and Chief of Harbor Police,
The Collector of Customs.
From the city:
The Chief Engineer,
The Harbor Master.
To represent private interests:
Two Members of the Chamber of Commerce.

This consultative committee is an active body with a direct interest in the affairs of the port, and corresponds somewhat to the "Board" at Liverpool.

The port is divided into two very unequal parts, the major portion offering 11 miles of wharfage, was built wholly at the expense of the city. The minor portion of the harbor consists of about 3½ miles of the right bank of the Schelde in the south edge of the town. And though these quays were built by the state, they have been handed over to the harbor authority of the city for administration.

The present municipal monopoly is of recent origin, for Antwerp in 1874 gave a private company the rights of operation in the harbor. The company, however, was incompetent, and the city, in order to make the service of the harbor adequate to the increasing demands of commerce, took over the ownership and operation of all the harbor equipment in 1890, since which time no port on earth has shown a more remarkable development. From fifth rank in 1870 the port has risen to second in all the world in 1906, with 19,662,000 net register tons entered and cleared; and in the last decade her rate of increase has been most rapid of all.

*Port Facilities.*—Antwerp illustrates as well as any port that can be named, the fact shown in various lands, that in proportion as good harbor facilities are provided the traffic of the port and country have expanded. "It is an invariable rule that harbor development on modern lines is immediately followed by new shipping and increased trade" (Stephens). Let Chicago take notice.

The total linear wharfage of Antwerp is: Of riverside quays, 3½ miles, which can accommodate about 40 vessels at a time; and of docks, 11 miles, accommodating a very large number of boats of all sizes, from the canal barges and Rhine boats to the largest ocean vessels.

There are on the average about 250 ocean-going vessels in port at a time, and several hundred smaller boats. Nowhere else in

**A row of Antwerp Municipal Warehouses, as clean and neat in exterior as a series of Art Galleries.**

the score of great ports visited, save at Hamburg, was there evident so much activity in shipping.

There is most excellent service in sheds and cranes. The sheds are about 360x195 feet, and sheds and tracks are arranged so that each shed with its trackage is a unit. The area of floor space in sheds is over 75 acres. Almost all of the sheds are of the one-story type. As a rule they stand well back from the edge of the quay with from one to three railway tracks in front, making it convenient to handle the freight from the rail to the ship direct. The sheds are made of steel with flat tar and gravel roofs, and walls of corrugated steel, which in the latest construction make use of an American invention, rolling up out of the way like a roll-top desk. The sheds along the city front have the roof made into a broad promenade overlooking the river and the shipping, a very pleasant feature, and one much appreciated by the people. The floors of all sheds are of Belgian block, and the drays drive everywhere through them as required.

In the newer installation the three railway tracks and the front of the shed are served by the finest cranes yet devised. These cranes have a single rail of track on the edge of the quay, and rise high above the cars on the three railway tracks and reach across them to the roof of the shed where the other track rail is placed. The railway tracks are arranged so that service at front, middle and rear of the shed can be given without interference with trackage of any other shed. Out-freight accumulates in the shed on the quay side of the middle track, in-freight on the far side from the quay. The handling of freight is most expeditiously done; the service is very efficient.

In warehouses the city is again far ahead of most other ports. The city owns six great buildings of absolutely fireproof construction. Across the street from the main quay and sheds on the river front, four of these buildings stand in an impressive row. They are four stories high, of ferro-concrete, faced with cream-colored repressed brick, and have much architectural merit. They are separated from each other by stone-paved courts of generous width for fire protection. They are really beautiful buildings, and they offer as clean and neat an exterior as a series of art galleries. Railway tracks run on the ground level along the mid-line of the series, to serve them all. Freight elevators serve all floors; the rooms are separated from each other by concrete walls and entrance to any room is by the elevator or by a concrete balcony on the outside of

the building. Nowhere else is there such absolute security provided for goods in storage. These warehouses are rented by the month, the rental varying from two cents per square foot on the ground floor to four mills per square foot on the top floor.

*Inland Transportation.*—The railways are owned and run by the government in Belgium. The state is equally interested in developing the interior waterways. There are over 1,200 miles of canals in Belgium alone, and these canals join as in one great system with those of Holland, France and Germany. The railways have through service to the great centers in the adjoining countries. All the transportation interests focus upon the harbor and conditions are thus ideal for a development without friction of all the agencies of transportation. It is for this reason that this port shows such phenomenal growth. In 1870 the net register tonnage of ocean vessels entered was 1,100,000, while in 1907 it rose to over 11,000,-

**Table of Tonnage Entered at Antwerp, 1850-1907**

See Insert, Page 70

| | Tons. |
|---|---|
| 1850 | 200,000 |
| 1860 | 425,000 |
| 1870 | 1,100,000 |
| 1880 | 2,600,000 |
| 1890 | 4,500,000 |
| 1900 | 6,700,000 |
| 1907 | 11,181,226 |

000. In 1904 there were 73 different navigation companies doing a regular business in the port. With the expansion of the harbor the interior waterways have had a phenomenal development. In the thirty-four years the tonnage has been multiplied by seven, while the average boat has grown to five times its size in 1870. As a matter of fact, the boats enter with about seven-eighths of a full load on the average, and leave with about four-fifths of a full load.

The railway traffic has had a similar development, though less strongly marked. Less than a million tons were received by rail in 1870 and over four and a half million tons came by rail in 1903. This is an increase of five times in thirty-three years. In 1903 the freight received by rail and boat was: By rail, 2,369,563 tons; by boat on canals and river, 5,529,673 tons. This is a very striking comparison and should be food for thought for us in Chicago. Here is Antwerp, second port in the world, receiving more than twice as

much freight from the interior waterways as is received by rail. Think what we could do in Chicago's hinterland with water transportation, if there were the same emphasis laid upon its development as is given to the railways.

For the traffic of the Rhine a special boat has been developed. It is made of steel, runs to 400 feet in length, to 47 feet in beam, but draws less than 10 feet of water even when its load is 3,500 tons. The largest of these boats do not come to Antwerp, but they are common at Rotterdam and will be more fully described later. The harbor is full of these boats at all times. Some of them have their own power, and draw a train of barges not so supplied. They do a great service as lighters, loading and unloading the great vessels as they lie at the quay. They also do a very great warehouse service, holding the merchant's stock a year or more if necessary, ready to deliver at any time and place desired.

*Growth of City and Port.*—In the thirty years from 1874 to 1904 the city of Antwerp increased in population from 153,169 to 301,647. That is, the city doubled in population, while its commerce increased between five and seven times. Antwerp is a commercial rather than an industrial town. And the business men of Antwerp are perfectly well aware of their commercial advantage. They have worked as one man to develop their port to its present high standing, and they see the possibilities of an unlimited future development. The old docks built by Napoleon a hundred years ago, stone walls and quays most substantial, are as busy as ever, though because of shallow sills, taking only the lesser vessels. A cluster of newer docks has been added to the northward, all of them closed off by gates from the 15 feet of tide in the river. The construction is of the finest; of concrete, brick or stone faced, coped with granite, the quays paved with granite blocks and brick. And though the capacity of the harbor has been doubled and trebled in the last thirty years, the demand pushes hard on construction. So the city has, after mature consideration, planned a marvelous great harbor extension, which, if carried out in full, will make the harbor of Antwerp the finest in the world. The docks and basins of the harbor are now at the north or down-stream end of the town, where the river bends sharply to the west. There are now nine docks connected by locks clustered around this bend. The ninth and farthest north is the first stage in the new extension (Fig. 13, p. 55). The plan is ultimately to provide a new channel for the river for five miles to the northwest, making a continuation of the broad curve which approaches the city from the

south, and cutting off seven miles of the present river which extends west of the present docks. This will remove two very sharp curves in the channel and will provide a tideless basin six miles long for an anchorage. The great dock system will lie to the northeast of the new channel, and parallel with it, and will consist of a channel 750 feet wide and four and five-eighths miles in length, connecting with the river by a lock at the northwest or down-stream end. Opening off from this channel to the eastward are nine slips 600 feet wide by about 4,000 feet long, to be lined on each side by sheds and railway tracks. There will be three turning basins of 1,300 feet diameter placed about a mile and a half apart, and at the western end a turning basin of about 1,600 feet diameter. Land has been reserved all around this extension for railway trackage and warehousing, and running completely round the docks, and through the reservation a grand boulevard and pleasure drive will be built. The land reserved for this extension is five miles long and 2½ miles at the widest, and has an area of over eight square miles. The first half mile of this new dock system is already in commission, and though not quite finished, it is crowded with ships and barges, serving to its limit even before sheds and tracks can be supplied. It is the plan now to begin construction on the next section, consisting of two slips and a turning basin, just as soon as this first section is completed.

It is estimated that the entire group of new docks will cost $55,000,000, exclusive of the river diversion, and will give Antwerp a total of 38 miles of quay, and five miles of quiet anchorage in the old bed of the Schelde. The total capital cost of the port to date is $45,000,000.

## The Port of Rotterdam

The logical gateway to the rich Rhine valley is the mouth of the Rhine river and Rotterdam occupies this position of advantage. With the richest part of Europe as a hinterland, this fortunate port is placed quite as favorably for handling the traffic of the world as is London. But between the city and the sea lies nineteen miles of the mud flats of the Meuse distributary of the Rhine, rapidly silting and treacherously shifting in channel. So long as boats drew only 10 feet of water, the passage from Rotterdam to the sea at times of flood tide was made with no great difficulty. But during the nineteenth century boats were increasing rapidly in size, and for lack of channel and harbor facilities the town was being left on one side in the world of commerce. The merchants of Rotterdam worked vigorously to improve the harbor, and succeeded in having the gov-

ernment cut a new and direct channel from Vlaardingen 14 miles to the sea. This channel was finally completed in 1896 at a cost of about $9,000,000. This New Waterway, as it is called, now gives a free channel of 27 feet at low water up to the quays of Rotterdam.

*Administration.*—Rotterdam is a very old port, and its history has been a checkered one, but only the latest events are of significance to us at this time. In the middle of last century the need of better harbor facilities was pressing, and charmed with the success of the trust administration in some of the larger ports of Britain, a private company was formed in 1873 and the port given over to its management. But the upbuilding of a great port was too large an undertaking for the private corporation and after sinking nearly $6,000,000 in the venture, it failed to meet its interest obligations,

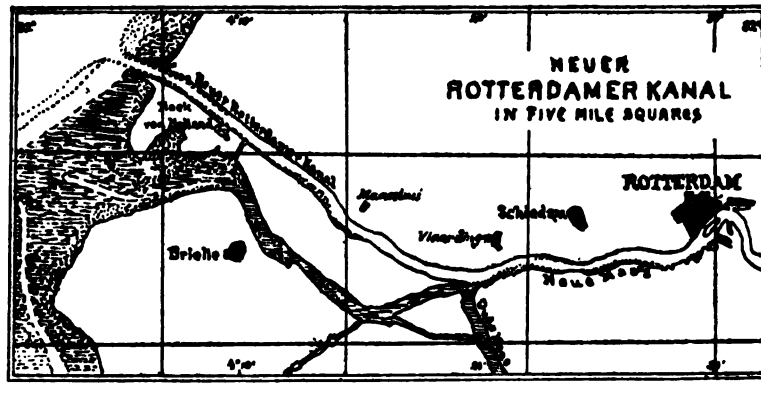



**Fig. 14. The New Waterway, Rotterdam to the Sea.**

and in 1882 its rights were canceled by the city, the entire harbor ownership and management being assumed by the municipality. Then a vigorous, earnest, determined policy of development was inaugurated which has worked wonders. The plan of organization adopted is that of a strict and complete municipal monopoly. The harbor problem is attacked as a matter of common public concern, just as are the questions of water supply, gas, electric light, the care of streets and the like. The harbor affairs are handled as part of the regular city business. The construction is in the hands of the office of Public Works, and the City Engineer's office has the engineering part of it in hand. The collector is a city official. The policing of the harbor is part of the regular work of the city police department. In short, every detail in the construction and conservation of the port is city work, recognized as a most important part of the city

administration. For it is very plainly perceived in Rotterdam that the development of the port is the sole means of giving her merchants an equal chance at the great prize of international traffic.

That this type of port administration has been the best possible for the city and her merchants, there isn't a shadow of doubt, as the record of her phenomenal growth most amply proves.

*Port Facilities.*—The New Meuse river flows through the town and forms practically one large harbor basin. The current is slight, and the tidal range is only about 4 feet, hence no gates or locks are necessary. The material to be handled is all mud or sand, hence the problems of construction are relatively simple. The case is almost

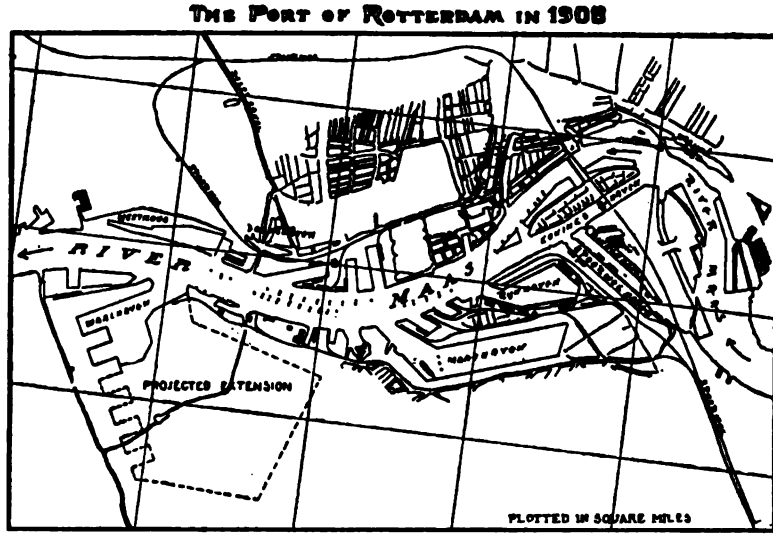



**Fig. 15. The Port of Rotterdam showing the Waalhaven Extension.**

identical with ours at Chicago. In the river a series of 62 buoys provides for the mooring of 32 sea-going ships at a time. Along the river on either bank are quays and havens, or basins opening off from the river, 57 separate quays and docks in all, having a linear quay extension of 23 miles and a water area of 460 acres. New basins have been added from time to time in the last twenty years, but as in Antwerp, the demand for docks and anchorage presses hard upon the supply. So there is adopted the plan of making a new great basin, the Waalhaven, on the left margin of the Meuse to the southwest of the town toward the sea. This addition will more than double the water area of the port, and the first two slips, or

about one-tenth of the entire area, are already dredged out and in use for the mooring of sea-going vessels.

Sheds are not so much in evidence here as elsewhere, as a great deal of the loading and unloading is done in the open basin, the vessels lying moored at dolphins and flocks of barges and Rhine boats pressing round to serve the freight to or from the ship.

*Inland Transportation.*—Two systems of railway, one owned, the other controlled by the state, put Rotterdam in close connection with the industrial centers of the hinterland. A belt railway line close round the town connects all the railway tracks and serves all the quays on either bank of the river. This belt line is a city undertaking also. But of far greater importance is the Rhine and its tributaries, and the network of canals all over the Netherlands and reaching on into Belgium, France and Germany. Focusing on Rotterdam as the point of greatest commercial opportunity are 130 lines of steamboats and 360 lines of sailing vessels plying the waters of the interior.

Rotterdam is growing very rapidly as a port of trans-shipment for northwest Europe, sharing in this trade with Antwerp and Hamburg. All three of these ports are taking over this important trade from London; for London is not holding her own in this traffic. The up-Rhine flow of freight is thus largely a matter of trans-shipment at Rotterdam and Antwerp. So it will be instructive to set down here a record of the traffic entered at Rotterdam (see de Jongh: le Port de Rotterdam, 7th Edn., p. 26).

**Number of Ocean-going Vessels Entering Rotterdam, and their Net Register Tonnage. Also Number of Boats Engaged in Inland Water Traffic, and their Total Capacity in Cubic Meters, 1850-1907**

| Years | Vessels entered. | | River and Canal Boats Entered. | |
|---|---|---|---|---|
| | Number | Net Reg. tons | Number | Total cubic meters |
| 1850 ..... | 1940 | 346,180 | ..... | ..... |
| 1860 ..... | 2449 | 592,978 | ..... | ..... |
| 1870 ..... | 2973 | 1,026,348 | ..... | ..... |
| 1880 ..... | 3456 | 1,681,650 | 63,542 | 4,008,188 |
| 1890 ..... | 4535 | 2,918,425 | 89,969 | 6,916,442 |
| 1900 ..... | 7268 | 6,326,901 | 115,345 | 15,044,049 |
| 1905 ..... | 8302 | 8,374,683 | 132,230 | 20,801,979 |
| 1907 ..... | 9375 | 10,197,502 | 143,242 | 24,643,711 |

This record shows the ocean traffic of the port trebled in fifty years, but it shows also the internal water traffic multiplying itself by six in twenty-seven years. This is most illuminating as showing what waterways may do where governments are interested in their development. All rivers and canals in Holland, Germany and France are free to all navigators, no tolls at all being charged except on certain canalized portions of the rivers Meuse and Main. The weight of traffic down the Rhine has increased from 4.6 million tons in 1888 to 16 million tons in 1906. Almost 82 per cent of this traffic is directed to Rotterdam. The increase in this Rhine traffic has given rise to a special type of boat, the Rhine boat, very long, very flat and with a surprisingly shallow draft. The proportions are

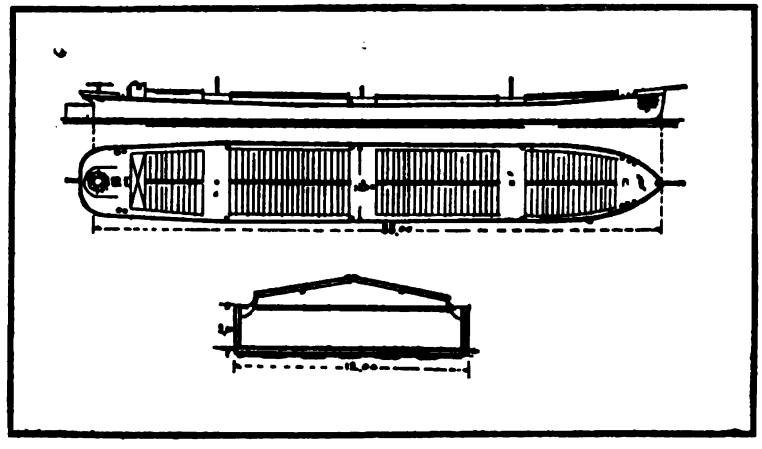
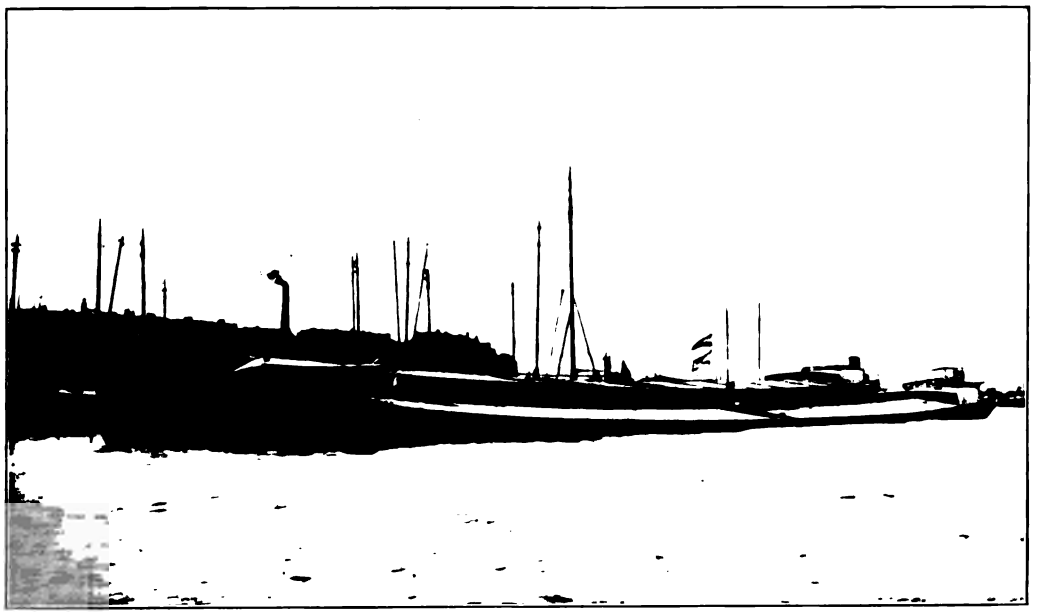


**Fig. 17. Plan, elevation and cross-section of Rhineboat. (After Kinart.)**

shown in the following illustration (Fig. 16) and in the drawings (Fig. 17), in which drawing, plan elevation and cross section are drawn to scale in meters. These boats are made of steel, the latest and largest ones are over 460 feet long and carry 3,500 tons of goods and over, with a draft of only 9 feet when fully loaded. The Rhine only offers a channel 9 feet 9 inches (3 meters) deep up to Cologne, and 6 feet 6 inches (2 meters) to Mannheim. These Rhine boats go tandem from two to five in a string, drawn by a tug or by one of their number which is supplied with its own power. They are a very familiar sight upon the Rhine. Being very efficient as carriers, their use is growing rapidly.

There is even a service of these Rhine Boats from the river towns to the seacoast towns of Europe. Cologne and Ruhrort have



(Fig. 16.) Rhine boats in the Harbor of Rotterdam.

thus become seaports, doing business with St. Petersburg, Riga, Danzig, Stettin, Kiel, Copenhagen, Hamburg, Bremen, London and several ports in the Mediterranean. This service is of recent establishment, and already handles between 3 per cent and 5 per cent of the total traffic of the Rhine.

The merchants of Chicago should take note. This service is already demonstrated. It should certainly be no more difficult to establish a service of the Rhine boat type on the Mississippi river and make the service to all lake ports, than to do this coasting trade in Europe from the Rhine towns. Chicago may well hope to become a greater focus of this trade than is Rotterdam, for our hinterland is many times richer and our opportunities much greater.

The following table is interesting as showing not only the increase in Rhine traffic in the past fifteen years, but also in showing the great supremacy of Rotterdam:

**Growth in Up-Rhine Traffic in Metric Tons**

Van Ysselsteyn (1908) p. 171

| Year | Amsterdam | Rotterdam | Belgium |
|---|---|---|---|
| 1890 ..... | 170,365 | 2,582,791 | 1,165,457 |
| 1895 ..... | 242,315 | 3,980,127 | 1,571,765 |
| 1900 ..... | 446,837 | 7,845,544 | 2,604,632 |
| 1905 ..... | 478,920 | 12,771,307 | 4,435,580 |
| 1907 ..... | 597,518 | 14,762,226 | 4,937,737 |

In all the statistics so far given, no record has been made of the small canal craft, market boats, lighters and the like. About 123,500 such small craft enter the harbor yearly, and they represented in 1907 a carrying capacity of about 25,000,000 cubic meters. As in Antwerp and Hamburg, there is an extensive use made of all these barges and Rhine boats as warehouses. No harbor dues whatever are charged the small boats, only a sort of annual registration fee is collected. So they are cheap and advantageous as warehouses. The small boats a generation ago were largely drawn by horses. Now the horse has practically disappeared and there is a large and growing use of petroleum motors for the propulsion of these small craft, and the waterways of Holland are dotted with them.

The relation of total tonnage of river craft and barges to sea-

going vessels is as 10 to 11, or 10 to 12, a ratio that holds rather constant with the growth of the port. The growth of railway traffic is not so marked. For railway carriage is not used at all for the cheaper and bulkier commodities, except when low water in the upper Rhine causes very high freights on water. The following table shows the increase in railway tonnage for a period of years:

**Increase in Railway Traffic at Rotterdam**

**See Van Ysselsteyn (1908) p. 173**

| Year | Goods sent | Goods Received | Total Tons |
|---|---|---|---|
| 1895 ..... | 799,110 tons | 703,429 | 1,502,559 |
| 1900 ..... | 812,392 " | 962,319 | 1,774,711 |
| 1905 ..... | 626,767 " | 1,440,763 | 2,067,530 |
| 1906 ..... | 674,275 " | 1,355,718 | 2,029,993 |

By comparing the two tables one sees that the total railway traffic of 2,029,993 tons in 1906 is only about *one-sixth* of the goods carried by the canal and river boats.

*The Growth of the City.*—Though the city of Rotterdam is a very old one, receiving the rights of a city in 1340, it was never a large city until a modern harbor was provided, giving its merchants an opening in international trade. In 1850 the city had only 90,000 inhabitants. This had grown in 1900 to 320,000, and now in 1908 it has over 400,000, or about 7 per cent of the entire population of Holland. This rapid growth is plainly recognized by all as being due to the development of the port.

It would be hard to find a city so small as Rotterdam which has undertaken so large a scheme of development with such signal success. The vigor of the people and the faith in the future have made the ventures step by step, resulting in one of the world's greatest ports. From 1870 to 1908 the city has spent in harbor construction and equipment the sum of $30,827,062. This sum includes the city's 10 per cent share of the cost of making the New Waterway to the sea, and also includes what has been paid for bridges and for real estate condemned for harbor extension, some part of which is resold at a large profit. Subtracting such investments, the capital cost of the harbor since 1870 is probably not far from $20,000,000. This

has been spent by the city alone. Not a dollar has been contributed by the general government.

On the various services the city renders in the port a generous income is realized, as the latest reports show. Van Ysselsteyn gives the income the city receives directly from the harbor activities for the year ending July 1, 1908, as 2,989,850 florins, or $1,195,940. Thus as a pure business proposition, the municipality is earning about 5 per cent on its capital investment.

## The Port of Hamburg

The strictly German ports of Bremen and Hamburg show us much the same development as Rotterdam. And since they are so nearly alike, a special study of one of them will suffice, and for our purpose the best lesson will be found in the case of the larger city of Hamburg.

*The Hinterland.*—The basin of the Elbe river is primarily the hinterland of Hamburg, and this is a considerable valley reaching nearly 400 miles to the southeast, across the German plain through a notch in the Erzgebirge, draining the basin of Bohemia and carrying water transportation to far Budweis in Austria. But a network of canals connects it across the northern plain with the navigable rivers Havel, Oder, Vistula, Prezel and Niemen, to Memel, the most northeasterly town in the Empire, and to Ratibor in the far southeastern corner of Silesia.

This is an extremely rich area, and there is a large movement of grain from Russia and Austro-Hungary to the west, and of sugar and salt from the farms and mines of Germany. And to the eastward from the Atlantic go great quantities of lumber, grain, fertilizers and the like. So the Elbe is a very busy river, and to the network of waterways is added a number of great railways focusing on Hamburg, giving a large invitation to Hamburg to become a great commercial metropolis.

But there are serious natural handicaps against the town. For its location on the muddy silting Elbe, 63 miles from the North Sea, has required endless labor and skill, and the expenditure of a mint of money in order to provide harbor advantages for ocean-going craft. So what Hamburg has done is really a record of the energy and wisdom of her business men, and the character of her port organization and administration.

*Administration.*—Hamburg is a free state and, like Bremen, is proud of being still one of the Hansa towns, which in the middle

ages established their independence from the robber barons, and became the guardians and promoters of commerce and all the arts in northwest Europe. It is a just and worthy pride; for to have maintained persistently for seven centuries a stable and very efficient government, guaranteeing the security of commerce and the rights of the merchant and his goods, is no small service. It is a credit that no great nation can lay claim to.

But in common with many other ports of Europe, the rise of the steel steamship in the middle of the nineteenth century made demands upon her port which were not met. The heavy handicap of 63 miles of muddy estuary held her back, and the favors of international trade went to other ports more favorably located or more vigorous in meeting the new harbor requirements.

About the middle of the century direct steamship service was established with America and then began a long list of improvements, which have resulted in making Hamburg a strong competitor for the head of the list of world harbors.

In Germany it is a settled governmental policy to leave harbor development and administration to the individual states. In the case of Hamburg and Bremen the state is coincident with the city, and so the harbor interests are in the hands of the people of the port.

In Hamburg the Senate is the ultimate authority, but that is about the same as saying for Chicago that it is in the hands of the city council. So in Hamburg and Bremen the administration is to all intents and purposes a municipal monopoly. The work of construction, care and maintenance is distributed among the departments of the city-state government. The funds, whether for new work or maintenance, are raised by the city, just as are moneys for any purpose, by bond issues or by taxation. Harbor receipts of all kinds are covered into the city treasury, and though the intention is to make the harbor work pay its way as nearly as possible, no attempt is made to make harbor income and outgo exactly balance. When I asked a high official in Hamburg how great a burden the large expense of harbor development had put upon the taxpayers, he replied with some warmth that it had put no burden at all upon them, "Gar nichts!"—an answer given with the evident conviction that the harbor income pays wholly for harbor improvement and harbor maintenance. This is extremely creditable if true, for there has been enormous outlay and practically every bit of the facilities for present ocean commerce has been provided within this generation.

A very strong feature in the administration of Hamburg is that of the free harbor. An inner area covering about seven-eighths of the harbor area of the city, but doing nearly all the harbor business, is treated as a separate country in the matter of tariff. Goods coming into it or going out of it pay no tariff. On land this area is cut off from the rest of the city by high walls or barriers, and every entrance and exit is guarded. Goods pass into Germany through the hands of customs officials and the customs laws of Germany apply. But goods from this free harbor may go out by sea to all the earth unhindered. So the raw materials come in free to factories maintained within the walls, and the finished product goes out by sea unhampered by tariff imposition. Goods may be stored in the warehouses any length of time, and reshipped without the payment of a duty. If shipped to any point in Germany, the duty is paid only at the time of delivery from the free harbor. The privilege of storing whole cargoes duty free, from which small orders may be delivered at any time to suit the customer, has been of inestimable advantage to the merchants of Hamburg. In this free harbor ships may be repaired, using duty free material and home labor. As a consequence, Hamburg has the greatest advantage of all the ports of Europe in the trans-shipment business.

Because of these great advantages a very extensive warehouse business is done in the free harbor. The city-state supplies the land and leases it to a warehouse company called the Frei Hafen Lagerungs Gesellschaft, a private stock company which works under conditions fixed by the city. The city specifies the kind of building and regulates the charges and operations of the company rather narrowly. The company is very old and very respectable, a sort of aristocracy among the merchants.

Large factories are being established in the free harbor. Two of the largest shipbuilding plants in Germany are within the pale.

The manifest success of this free harbor in Hamburg merits study by us in America. It ought to prove quite as profitable for us here at Chicago as for Hamburg, and it should be an advantage so great to our merchants as to put them in control of the markets of half the continent.

*Port Facilities.*—The tide at Hamburg has a range of only 6½ feet. Hence no locks or gates are necessary and costs and problems of construction are relatively simple. The river from Cuxhaven at the mouth has a navigable width of 650 feet, and a depth of 26 feet at low tide, though there is a bar at one place with only 16½

feet at low water. So all the larger boats must wait for high water to go up to Hamburg, and the great Atlantic liners of the Hamburg-American line have to lighter part of their cargo at Cuxhaven.

The harbor of Hamburg consists of the open river and many basins alongside, extending for five miles through the heart of the town. These basins offer room for 450 sea-going vessels at a time. They have a total water area of 332 acres and there are basins for river craft with 132 acres more. A network of canals and the canalized Alster river, which joins the Elbe in the town, gives 485 acres more of water available for small craft. And, as in the other growing ports still more room is needed for the increasing commerce, new

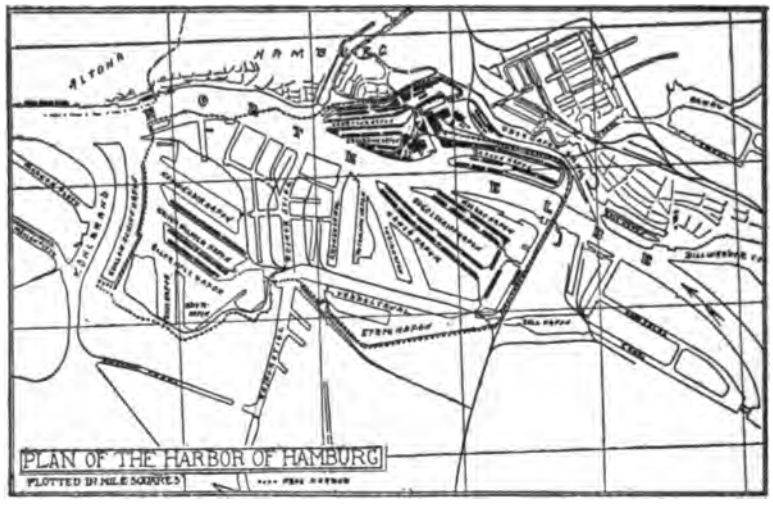



**Fig. 18. The Harbor of Hamburg.**

basins are being added in the southwest or down-stream edge of the town. This makes the total water area of the Hamburg harbor 1,282 acres, which gives a linear quayage for sea-going vessels of over fifteen miles, and riverside accommodation brings this up to nineteen miles. In addition to this there are twenty-one miles of riverside and canal accommodation for river craft. The basins are made broad and spacious and mooring posts or dolphins are provided in great number, each dolphin consisting of a score or more of wooden piles driven into the bottom and chained together into one large post. Ships tying up at these dolphins pay no wharf dues. It is estimated that 62 per cent of all the freight in the harbor is handled between the ship and the barge direct, and about 38 per cent over

the quays between cars and ship. Next to nothing is handled to or from the ship by dray. These basin mooring places are quite as busy as the quays. Thus the berth accommodation of the port is doubled.

The sheds are of one story, almost all of very cheap construction, most of them of wood with corrugated iron sides. They are about 160 feet wide and from 360 to 1,300 feet long. These sheds have a total area of about 91 acres. Most of them are set back two or three railway tracks from the edge of the quay, and the newer ones have driveways for teams at rear. The older ones stand flush upon the water's edge, because so much of the loading and unloading is done by lighters, but even these sheds have ample railway tracks at the rear.

The warehouses of the port are a very different matter. They are almost universally of brick and those within the free harbor are from 6 to 12 stories high, standing in the edge of the water, to be served directly from the ship or barge. But most of the 106 acres of warehouses are distributed along the canals and basins all over the city, being served mostly by the harbor barges. These barges are everywhere and always busy. There are 4,000 of them devoted entirely to harbor service, and not going out of the city. As in other German ports, these barges serve extensively for warehousing. As many as 800 of them at a time may be in this service, and since no harbor dues or fees are assessed on them, they may lie at anchor for years at no expense, making an additional incentive to their use for warehousing.

The striking thing about the warehouses is their architectural beauty. The end of a row of warehouses is considered an architectural opportunity. It is finished with towers and spires and finials, as fine as high-class residences. At the upper end of Brooksfleth canal the chapel of St. Ann some years ago had to give way for the extension of the warehouses. But the warehouse is finished at St. Ann's platz as nicely as a church and even the statue of St. Ann from the old church was given a niche in the end of the building commanding the square.

This thoughtfulness on the part of the city to have buildings and premises beautiful if possible, but neat and clean in any case, is very striking in contrast to our usual American condition. My gentlemanly guide, the Harbor Master, expressed the cultured German attitude as we passed St. Ann's platz. "We believe," he said, pointing to the building, "it is worth while to have things beautiful even in the everyday working places of men!" And that it is worth

while every one will testify who has been in Hamburg, for the harbor with its warehoues and ships is the most attractive part of a very interesting city.

*Inland Transportation.*—As in Rotterdam, the inland waterways are the principal feeders in the commerce of Hamburg. There are 7,500 miles of navigable rivers and canals in Germany, and these waterways are absolutely free to all exactly the same as our common roads, and for the same reason. Because of this the traffic on the waterways is wholly in private hands, and with a multitude of private owners of craft engaged in the business of transportation. As a result of this free highway the bulky goods of Germany move wherever possible by water. The railways carry goods of less bulk and more value.

In the magnificent annual report of commerce issued by the city, "Hamburg's Handel and Schiffahrt," the commerce is recorded in great detail, as traffic by rail and by water, in and out of the city, weight and value by articles. Some of these data make very interesting reading. For example, in 1906 the total weight and value of goods carried was: (See Hamburg's Handel und Schiffahrt, 1906, II., p. 18-19 and II., 11-13.) From the hinterland to Hamburg: By rail, 32,884,097 doppelzentners, valued at 1,486,553,220 M.; by water, 35,677,964 doppelzentners, valued at 624,512,830 M. To the hinterland: By rail, 17,635,889 dz., valued at 1,147,332,680 marks; by water, 50,079,383 dz., valued at 986,729,660 marks.

That is, the tonnage down the Elbe valley by water and by rail is about the same, but the value of the goods carried by rail about double that carried by water. But in the traffic up the valley the water carriage is about three times the weight of the railway traffic, with a value less than half that carried by rail. The character of the goods carried by water in 1906 up and down the Elbe is shown in the following table (Op. cit. I, pp. 80-81):

| UP THE ELBE. | Per cent. | DOWN THE ELBE. | Per cent. |
|---|---|---|---|
| Coal and coke | 22.61 | Fire wood | 4.45 |
| Iron | 5.64 | Salt | 18.87 |
| Saltpetre | 4.12 | Sugar | 33.07 |
| Guano | 18.07 | Wares of stone, zinc, etc | 24.16 |
| Grain | 22.37 | Grain | 1.97 |
| Package freight | 27.19 | Package freight | 17.43 |
| Total | 100.00 | Total | 100.00 |

That so much of the traffic of the country is done by water is not surprising when we learn how freight rates compare between rail and water. From Hamburg to Berlin is 158 miles. It costs 1.38 marks to send 100 kilos (220 pounds) of grain this distance by rail, and but .3 marks by water, or about five times as much by rail as by water. On general merchandise by rail the rate is 2.96 M. per 100 kilos, and by water .45 M., or about six times as much by rail as by boat. Coal, ore and lumber do not go up these valleys by rail at all, the rate by water being comparable to that of grain.

From Hamburg to Dresden is 250 miles in a direct line. On grain the rate by rail is 2.2 marks per 100 kilos, by water .37 marks, or about seven times as high by rail. On general merchandise the water rate is .4 mark per 100 kilos, the rail rate is 4.38 marks, or almost eleven times as much by rail as by water.

One other case will be instructive. There is a considerable traffic by boat between Hamburg and Cologne. The direct distance is about the same as to Dresden, but boats must go a long roundabout way down the coast and up the Rhine. The rate on grain from Hamburg to Cologne by rail is 2.04 marks per 100 kilos, by boat .75 mark, or about three times as much by rail as by boat. On general merchandise the rate by water is 1.40 marks per 100 kilos, by rail 4.14 marks, or about three times as high by rail as by boat.

It is most illuminating to see that in a country where the government owns or controls the railways, and fixes the rates itself, that a system of free highways in rivers and canals should handle so large a fraction of the traffic of the country at rates relatively so low. It is plain to see that on our great rivers and between them and the great lakes a water-carrying power equal to the railways which parallel these waterways is lying fallow and undeveloped. And that if we should make water highways adequate and insist upon fair play between rail and water that Chicago has a most splendid situation with reference to the focusing of commercial interests in our great central plain.

*Growth of Port and City.*—In 1866 there was next to nothing in the way of harbor equipment in Hamburg. Ships anchored in the river and unloaded into barges, or swung to at the wharf and unloaded on the open quay. Since the awakening in 1866 the growth of port and city has been phenomenal. The net register tonnage has risen from 2,857,481 tons entered in 1880 to 12,731,749 tons entered in 1907. It is estimated that the total expenditure from 1880 to date on the harbor alone, including the auxiliary harbor at Cuxhaven,

is about $100,000,000. This does not count the cost of warehouses or equipment, nor does it count any expenditure for channel improvement. The German government takes care of the channel.

And even with this enormous expenditure, the demands of shipping press close on the harbor capacity and extensions are again under consideration. Hamburg in 1907 is doubtless the leading port in tonnage in all the world.

# II. Chicago's Commercial Opportunity

One of the remarkable phenomena of the nineteenth century was the magical rise of Chicago. From a struggling village sunk in the mud of a prairie creek it rose within the memory of living men to a great metropolis, ranking fifth in the roll of the world's great cities.

It was inevitable that Chicago should assume this rank, for Chicago is a city of destiny. The record of the past lies open, and he who will may run the gamut of the causes which have worked together in the production of the present metropolis. And if this be wisely done, we shall be in a position to evaluate the resources and forces geographic and economic which condition our future growth. And so we can plan sanely for a long future and for a greater city than has yet been.

## 1. The Strategic Position

Chicago has developed in an era of dominant East-West traffic. For the traffic of America up to date has been most largely a sending of raw materials to the old and densely populated lands of western Europe, and receiving back the manufactured articles which such peoples produce. Few people realize what a large fraction of the world's commerce it is, which goes on across the North Atlantic. In the accompanying map (Fig. 19) the world's ocean commerce is graphically represented by the shaded bands across the seas between the various ports. The broader the band the greater the flow of traffic. One can see at a glance that the great bulk of the ocean trade goes on between the ports of Northwest Europe and our Atlantic ports at the northeast. The only other flow of trade comparable is that from the same European ports to the Orient and to the Tropics. The trade of the Pacific-Indian ocean, and our trade with the Tropics are insignificant compared with this traffic of the north Atlantic. This great flow of trade from West Europe to the Tropics should be remembered with reference to Chicago's future. We, too, have a potential highway leading to the Tropics, which we shall some day use.

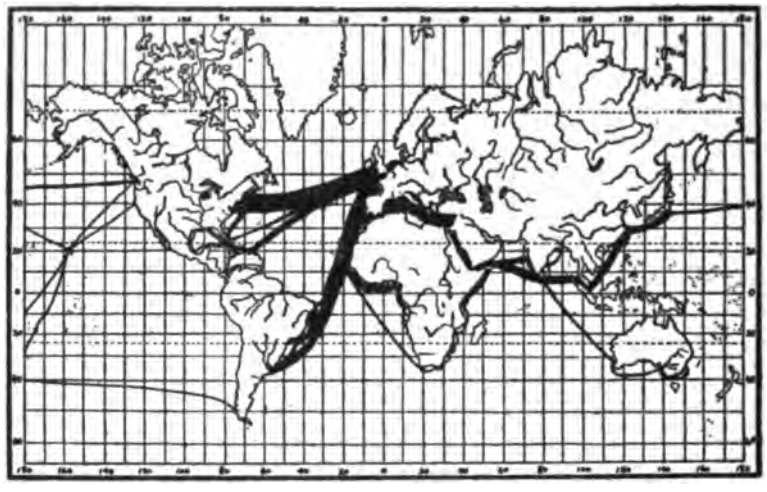


Fig. 19. The flow of ocean commerce.

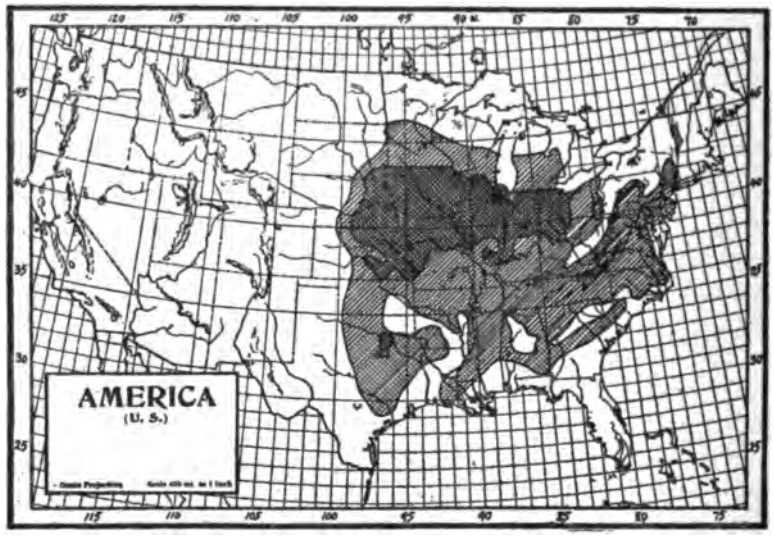



Fig. 20. Map of U. S. A. to show the eastern lowlands. Contours of 500, 1,500 and 2,000 feet. The cross-hachured area is less than 500 feet above the sea. The diagonal shading is land between 500 and 1,500 feet. The solid black is over 1,500 feet above sea level.

The next element of advantage in the growth of Chicago is the fact of our location in the heart of the great American lowland, which, smooth and fertile, covers the eastern half of our country. The significance of this is patent when we recall that over 90 per cent of the world's food supply and population are found on the land below an elevation of 2,000 feet. This great eastern lowland of ours in addition to a matchless climate, inviting the production of the great cereal and other crops, and the growth of forests, has the smooth surface which invites the building of roads and railways, and the use of labor-saving farming machinery. And this eastern low-

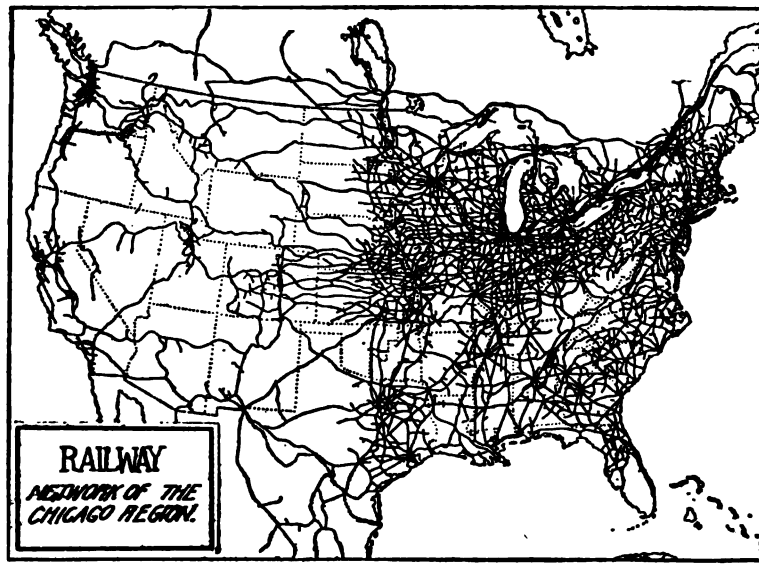



Fig. 21.

land compares favorably with all Europe in the productive power of its mines and soils. Chicago's superlative advantage lies in her position in the heart of this splendidly productive area. And in this area a peculiar influence compels the growth of a great commercial focus at Chicago, and that is the size and position of Lake Michigan, which spreads its awkward 300 miles of deep water right athwart the lines of east-west traffic, so compelling land lines of transportation to concentrate round the southern end of the lake. The flat land, the fertile soil, the markets at the east and the Great Lakes compel a metropolis at the place of Chicago. That is why the 27 railway systems focus at Chicago, making the greatest railway center on

earth. For railways are built where it pays to build them, where there is freight to be carried. Let us take an account of stock of the resources of the hinterland of Chicago, so we may be sure why we are great, and how much growth is yet to come from the resources assured.

## 2. The Hinterland

The region round Chicago, which looks to Chicago as the market of its chief commodities, and to the Chicago merchants for a goodly share of their purchases, is what is considered our hinter-

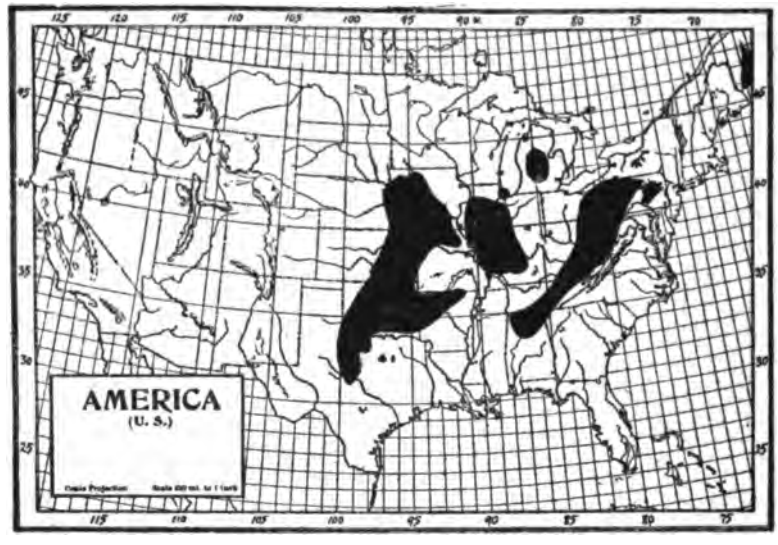



**Fig. 22. The chief American coalfields.**

land. Roughly, this is an area while only extending eastward into Michigan and Ohio, reaches on the south, west and northwest from 750 to 1,000 miles and over. This is an area rich in mineral resources, and the richest area of the size on earth in the matter of soils. It is this area which produces the most of the limestone and cement rock, which in 1906 were valued at $55,000,000. The American output of coal, which in 1907 was 370,000,000 tons and valued at $513,079,809, was about one-fourth of it produced in the Chicago area, and the great Pittsburg field, which produces nearly one-half of the American coal, is not so far away but it furnishes us a deal of coal and coke, both by lake and rail.

Then there are the metals. Very rich deposits of iron, copper, lead and zinc contribute to the wealth of the Chicago region. Of these, the iron output of the country was alone in 1907 worth $529,-958,000, about 80 per cent of which was taken from the mines in the Lake Superior region. This iron is mostly worked up in the Pittsburg region, because the coke, the limestone and the markets are there, and the Great Lakes provide the cheapest of all transportation. The map (Fig. 23) shows these relations, and it also shows us how

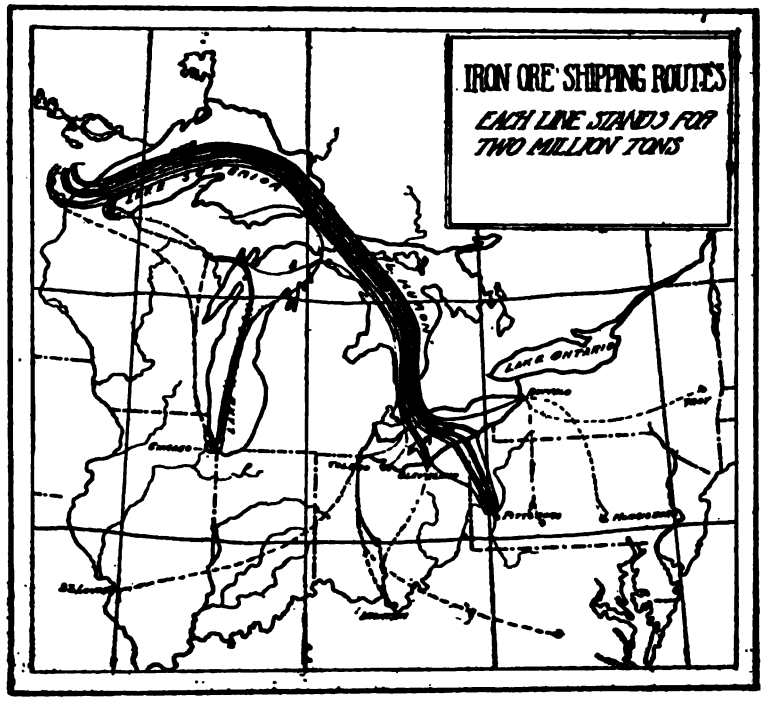



**Fig. 23. The source and destination of our iron ore.**

very small our share is in that iron industry. Cheaper (water borne) coal would give us a larger share. We could have the cheaper coal by supplying the waterways to the south—a thing we will do when we are awake to the opportunity.

But better than all the minerals and ores is the *flat land*, the *fertile soil* and the *good climate* of the Chicago area. A mine yields but one crop, and the resource is gone forever. But these rich soils will keep on producing their great crops for tomorrow's ten thousand years. And it is the crops from these rich farms more than all

the minerals which has made America great and Chicago a metropolis. The soils in the Chicago region (Fig. 24) are the richest on the continent. This is because they are new soils, contributed by the melting ice sheet of the Great Ice Age; soils gathered from the thousand miles of Canada passed over in the southward flow of the great ice. Such soils have all the constituents needed by vegetation. The area of this rich soil, once known, can be discerned in the maps showing the distribution of corn, wheat, oats, hogs, cattle, improved land, cities and railways. And we have only begun to develop the possibilities of this new soil. Let us look at a few of these rich crops, remembering that it is the toll on these commodities which has made Chi-

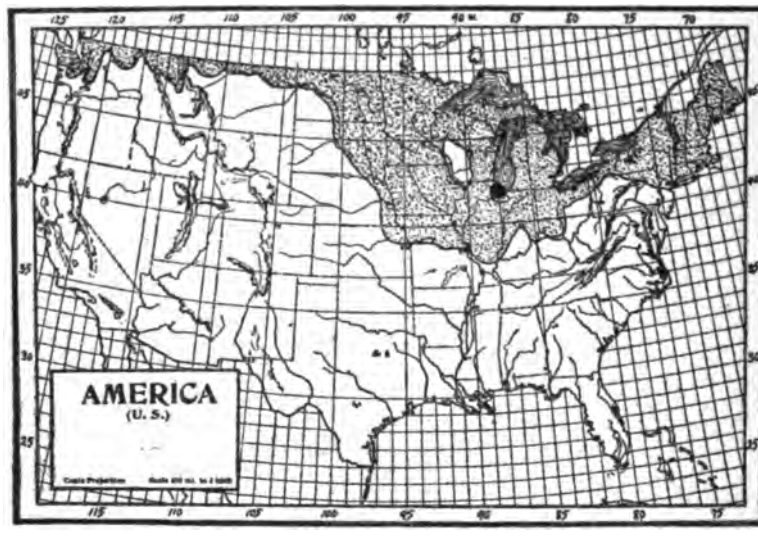



**Fig. 24. Area of glacial soil.**

cago grow great and New York far greater. They are the bank account upon which the Chicago of the future must draw in its growth.

The wheat crop of the country in 1907 was 625,576,000 bushels, valued at the farm at $500,000,000. The center of wheat production is in western Iowa, about 400 miles west of Chicago. The surplus crop moves eastward to its market and throughout her whole history Chicago has levied tribute on the crop in transit. It has been one of the greatest sources of bone and sinew in our growing commercial frame.

The maize crop of America in 1907 was 2,553,732,000 bushels, valued in the farmer's crib at $1,350,000,000—a sum equal to three-

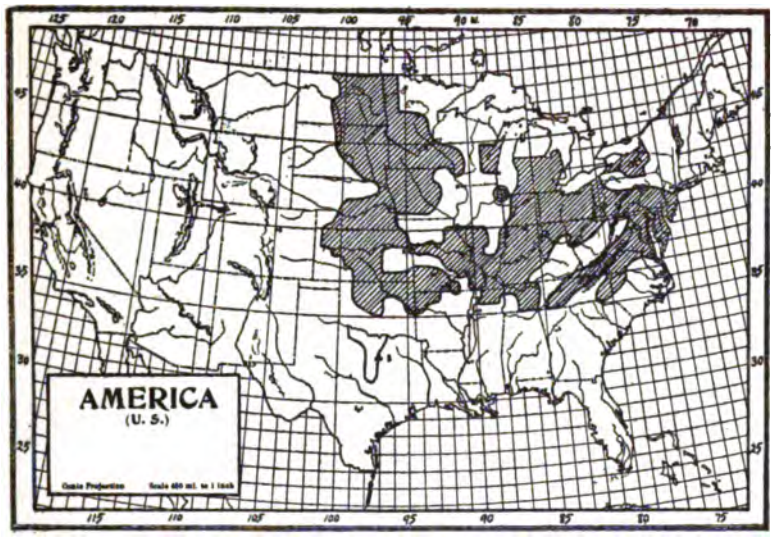



Fig. 25. The chief wheat producing area.

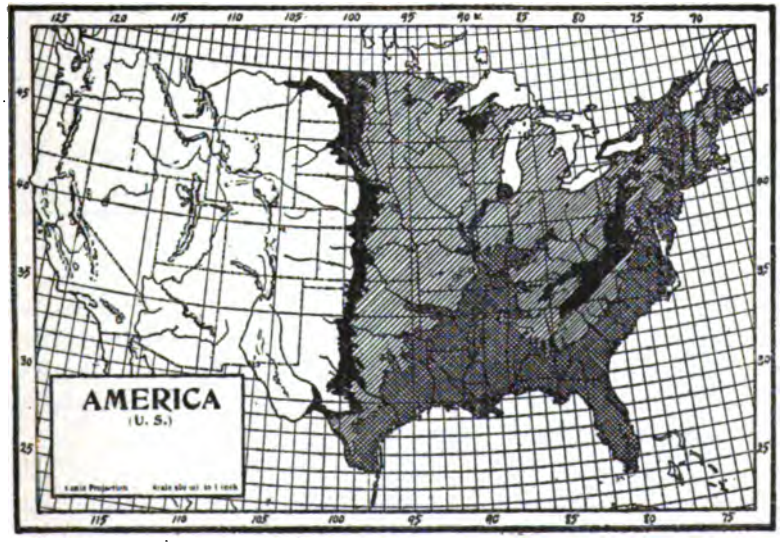



Fig. 26. The chief corn producing area.

fourths the value of the entire mineral output of the whole country in the same year. And this is the crude corn before it is converted into pork and butter and starch and glucose and the long list of other high-priced commodities which finally get to the consumer. Three-fourths of this gigantic crop is grown in the area commercially tributary to Chicago, and this city is its natural market.

One-third of this corn crop is fed to the hogs, and the swine map is quite the counterpart of the corn map. One could be substituted for the other. The year's swine are worth $325,000,000 and most of them go to market by way of Chicago. Hogs and cattle have been far and away the largest contributors to the wealth and

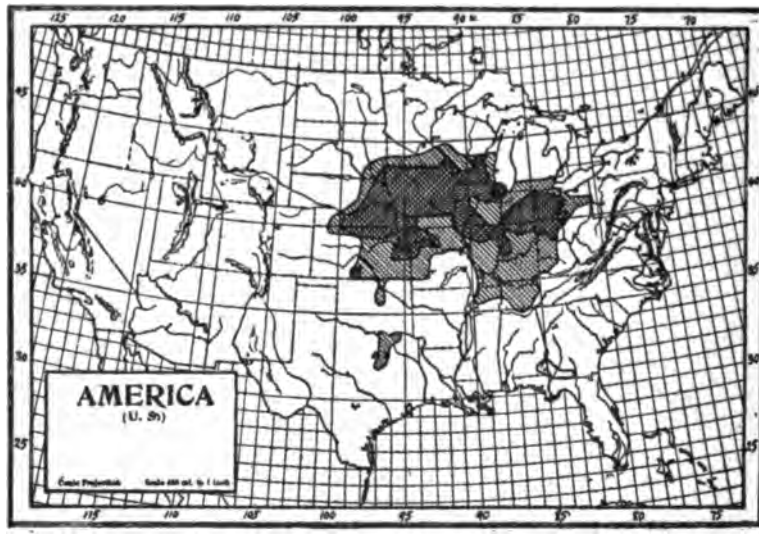



**Fig. 27. The area of maximum swine production.**

upbuilding of Chicago, and it is as the source of meat foods that Chicago is known the world around. Chicago's easy supremacy in pork packing is shown graphically in Fig. 28, the recent slowing up in the rate of increase marking suggestively the rise of other packing cities in the corn and swine area.

The oats crop is a sort of understudy to the corn. In 1907 this crop was 741,521,000 bushels, valued at $360,000,000. And again the lion's share of the nation's yield is in the Chicago area.

Hay, too, which has risen to second place in crop values, shows the same great concentration in the central lowland, and following corn and hay, the distribution of cattle discloses the old story of

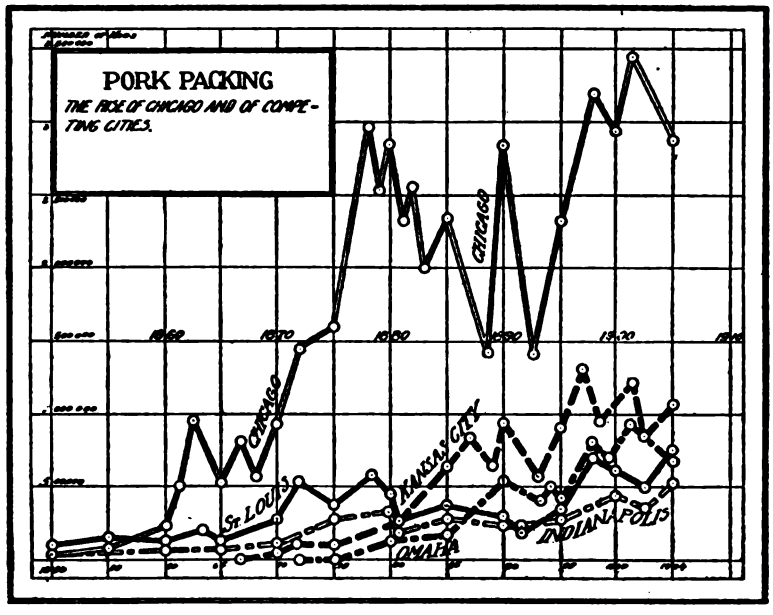



**Fig. 28. The growth of Chicago in pork packing.**

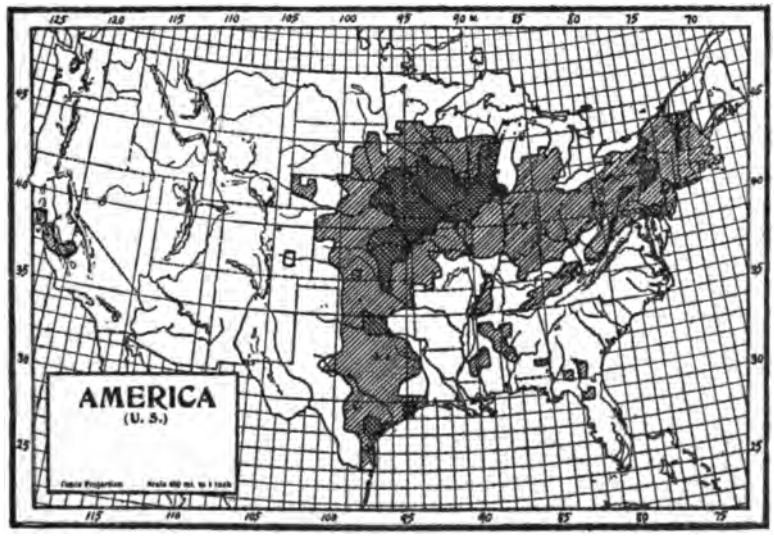



**Fig. 29. The area of maximum cattle production.**

maximum wealth in the Chicago region. Not on the Great Plains, but here on the rich corn lands looking to Chicago as the chief market, the bulk of the nation's cattle are kept. In every port of Western Europe the business men I met knew the Chicago region as the source of most of their imports.

Only a few of the great resources have been mentioned, but each one exhibits the one significant fact, that Chicago is a great commercial focus, because conveniently located to handle the products of the rich central lowlands, and to send back to the producers on the farms the multitude of commodities a prosperous and intelligent people demands. And Chicago is great in proportion as she is an efficient clearing house for this gigantic hinterland. For the hinterland of Chicago is one which in natural wealth and possibilities rivals not one European country alone, but all of Western Europe combined.

## 3. How Chicago Became a Metropolis.

The opportunity to become a metropolis, and the measure of that opportunity are found in the wealth of the region to be served. Chicago's advantages are very great, but equally great are the advantages of St. Louis, save in one respect only—Chicago is on the Great Lakes, and St. Louis is not. In fact, St. Louis is better located than is Chicago with reference to the area of richest farming land; and almost as well located as Chicago with reference to transportation by rail with New York and the other North Atlantic ports. But these two cities have risen in the era of east-west moving traffic, and for this reason the Mississippi river has not been so serviceable to St. Louis as the Great Lakes have to Chicago. Many of us can remember the time when there was a rivalry between these two cities, for in the river steamboat days St. Louis was a dangerous rival of Chicago. The record of the rise of three cities, New York, Chicago and St. Louis (Fig. 30), is most instructive. The rate of growth from 1850 to 1870 was much alike in all three cities, St. Louis just ahead of Chicago and running neck and neck. From 1870 to 1890 New York and Chicago ran with an increasing rate of gain, St. Louis slowing down a little. From 1890 to date enormous gains for Chicago and New York, and St. Louis drops out of the race. Since 1870 St. Louis has largely lost her steamboats, and because of this has wholly lost her rank. Chicago, less advantageously placed than St. Louis with reference to the products to be

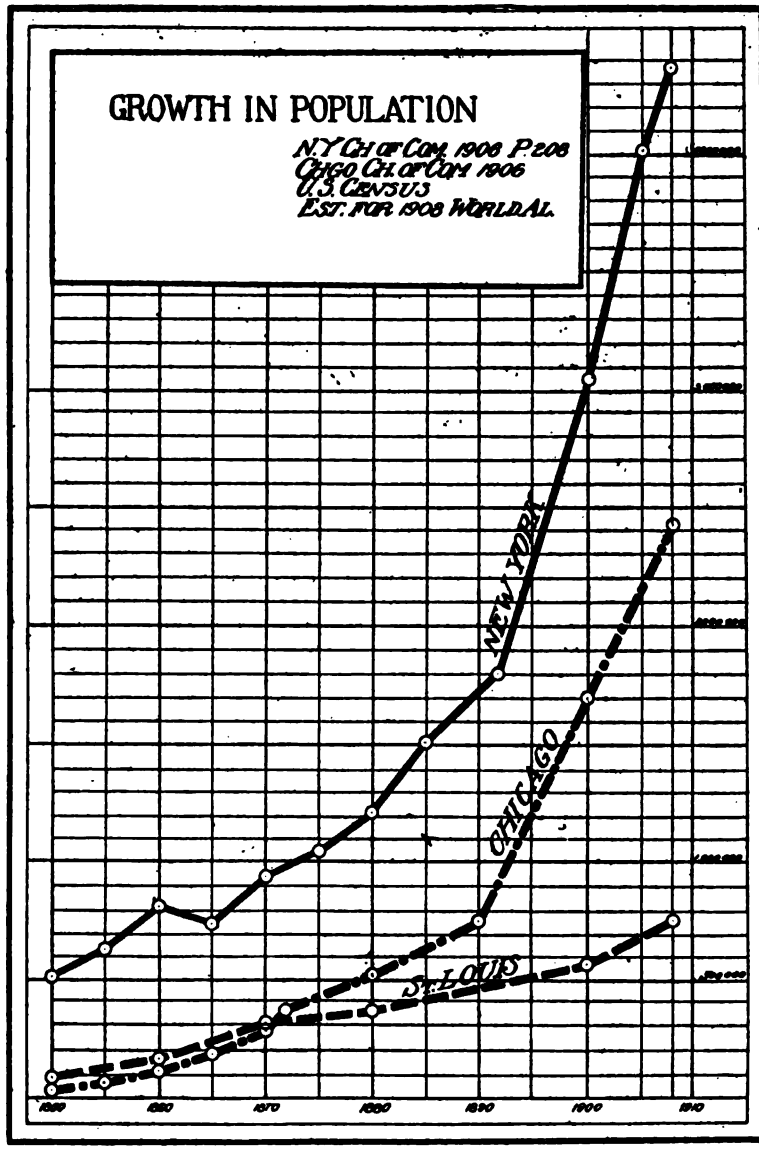



Fig. 30. The rise in population of three cities.

exported and the population to be served with westward moving freight, has forged ahead of all competitors to the commanding position of mistress of the great and immeasurably rich central plain, because *she had a choice in transportation routes to and from the east.* Economic freedom consists in having a choice. *St Louis lacked the water route to the east. Chicago was free. She had an option.* Her merchants could send their wares to the seaboard by water always at lower rates than by rail. We have the evidence on record in the case of some commodities. Take, for example, wheat,

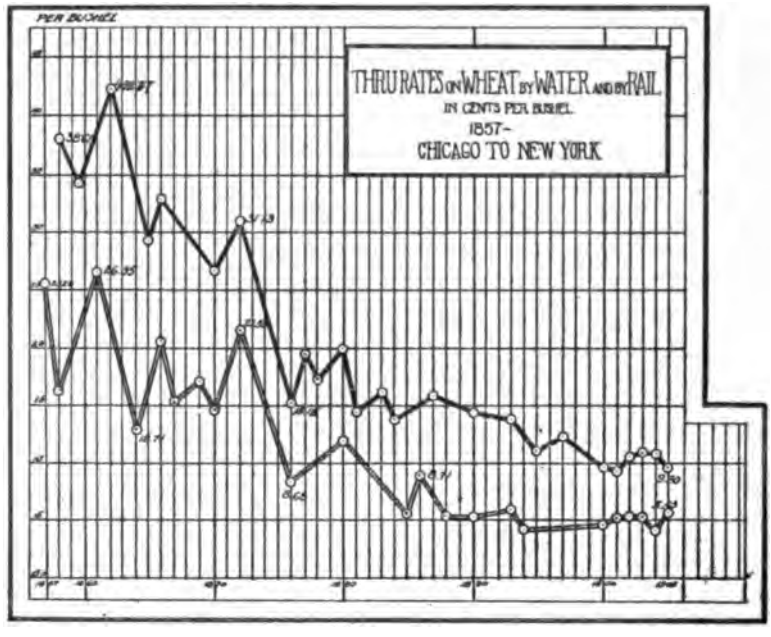



**Fig. 31. The published rates on wheat by water and by rail.**

which was one of the largest contributors to the list of eastbound commodities during the period under study. The published rates for the all-rail haul Chicago to New York was, in 1862, 42.37c, and by the all-water route 22.50c. From this high point there has been a steady decline in the case of both water and rail, but always with the wide range of difference between them, the rail rate being from two to three times as high as the all-water rate. It is well to keep in mind that these are the *published* rates. We are all well aware that large and favored shippers have through the most of this period enjoyed much better, though unpublished advantages. Thus the Chi-

cago merchant has always had the superlative advantage of water competition on freights to and from the east. This does not mean that most of the freight has been borne by water. That is not necessary. The water route is closed nearly half the year. The railroads are in service at all times. The rail unit of car or train may go through unbroken. In the more important freight service by rail the time in transit is shorter. For such advantages one is willing to make some sacrifice and pay rates higher than by water. So the railways have done by far the largest fraction of the carriage. But the *potential competition* of the water route has always been a trump in the merchant's hand—and the railways have lowered their rates constantly to get the business. Such low rates naturally diverted a very large fraction of the east-west freight to the route along the Great Lakes, betwen New York and Chicago. This large flow of freight in turn was so great a prize for the railways that new railways have continually entered the field to get a share of it, and as a consequence by inter-railway competition the lowest freight rates in the world have ruled *between Chicago and New York.* We must not forget that these lowest rates have always been between Chicago and New York. Not between St. Louis and New York, or between Chicago and Baltimore or Philadelphia, the nearest Atlantic ports to Chicago. Every man in business knows, and every man in the street ought to know, that these low rates have been a special favor to New York and Chicago, and not to any other cities east or west. That these special favors have made it possible for these two cities to grow great, while Boston, Philadelphia, Baltimore and St. Louis have been kept in the background. And that this bestowal of rich favors in low rates and good service has accrued to New York and Chicago, not because of any special love the railways have had for the merchants of these two cities, *but for the sole reason that these merchants have had the active or potential competition of a water route in giving them a low rate.* These curves showing the growth of great American cities should be studied by the average citizen in all these cities favored or discriminated against, for in the final analysis the average citizen pays the freight, and the question of water competition in helping to establish low freight rates touches him most intimately.

And this point is of most significance to us in Chicago in view of the constant efforts, open and veiled, to suppress water competition and put the water traffic on the shelf. Chicago is great because of the water route to the east. The Great Lakes could not have

done the service alone. The Erie Canal has been quite as large a helper in our upbuilding. And it was our greatest good fortune that this is a state-owned canal, and hence not to be controlled in the interests of the managers of through rail service. How many efforts have been made by private parties to buy it up, or to cripple its service with one device after another! And that these methods have been successful seems patent. It has been reported before this Commission by a railway man in a position to know that "today the Erie Canal competition is ignored by the railways." To have the Erie Canal suppressed, and to have our harbor go into decadence is, for Chicago, to kill the goose that laid the golden egg. If the Germans had the Erie opportunity it would be a ship canal with 28 feet draft,

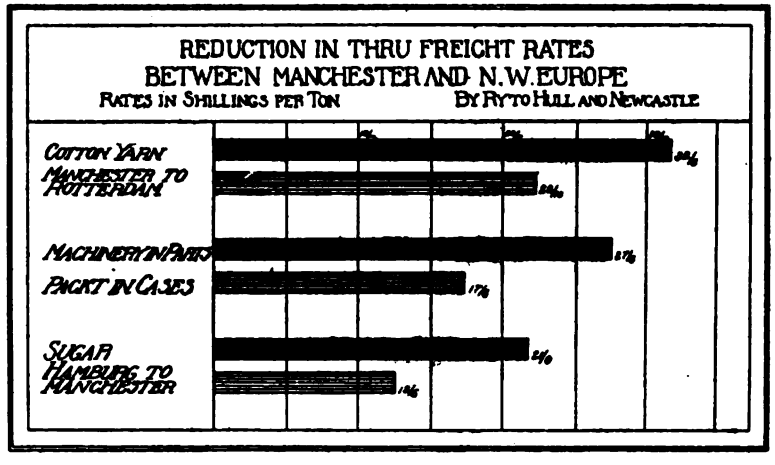

REDUCTION IN THRU FREIGHT RATES
BETWEEN MANCHESTER AND N.W.EUROPE
RATES IN SHILLINGS PER TON
BY RY TO HULL AND NEWCASTLE
COTTON YARN MANCHESTER TO ROTTERDAM
MACHINERY IN PARTS PACKT IN CASES
SUGAR HAMBURG TO MANCHESTER

**Fig. 32. Freight rates at Manchester.**

locks 1,000 feet long, taking vessels from every sea to Chicago, and converting every lake port into an ocean port, and enormously expanding our commerce.

Manchester's experience in this connection is illuminating. For, like Chicago, Manchester is a city in the focus of a very rich and industrially active region. And the merchants of Manchester to do business with the outside world, had to accept the conditions imposed by the railways, and by the port of Liverpool. They felt that the rates were too high, both by rail and in the port. They plead for better conditions, but got no satisfaction and not much attention, until the people of the town decided to solve the problem once for all and bring the sea to their own doors. And when the canal was

authorized and work begun, rates came down. And when the canal was opened and the freight began to go past Liverpool without paying tribute, the rates came down again. The measure of the advantage to the people of Manchester is made graphic in Fig. 32, showing reductions of from 30 to 50 per cent in the freight charges on the chief commodities.

Since the growth of Chicago has been due to having a water route between the great central plain and the markets of the outside world, the logical conclusion is not hard to arrive at. It is of the most vital importance to Chicago to keep and to enlarge in every possible way the alternative of water facilities in transportation. And since it is perfectly patent that a large fraction of the wealth and commercial advantage New York enjoys is due to handling over the traffic to and from the rich Chicago region, it is high time that the people of Chicago begin to take measures for the establishment of deep water communication with the sea, so that we may collect the toll and reap the benefit of handling our own freight, rather than turning it over to New York.

## 4. The Manifest Destiny

The manifest destiny of Chicago is that she shall become the commercial focus between the rich central plain and all the rest of the world. To do this, one absolutely essential step is plain—*Chicago must become her own seaport.* And nature has been lavish in offering us opportunities for this ambition. A ship canal will bring the freight vessels of all the world to our own wharves. Our merchants may be independent both in importing and exporting in the service of the large and growing population in the Chicago hinterland.

The depth of channel requisite is shown in the studies of the freight traffic of many ports. Take, for example, the case of Glasgow. The records of the Clyde Navigation Trust show that of a total of 300 vessels of 22 feet draft and over entering the Clyde river in 1900, 100 were of 22 feet draft, 90 were 23 feet, 73 of 24 feet, 31 of 25 feet and only three each of 26 and 26½ feet. And in 1907 the same records show that in a total of 17,740 vessels entered at Glasgow in the year ending June 30, 1907, 11,256 were of 100 tons burden or less; 4,337 had a tonnage of 100 to 500 tons; 708 were of a tonnage over 500 and less than 1,000; 578 were over 1,000 and less than 2,000; 713 had a tonnage between 2,000 and 4,000; 144 between

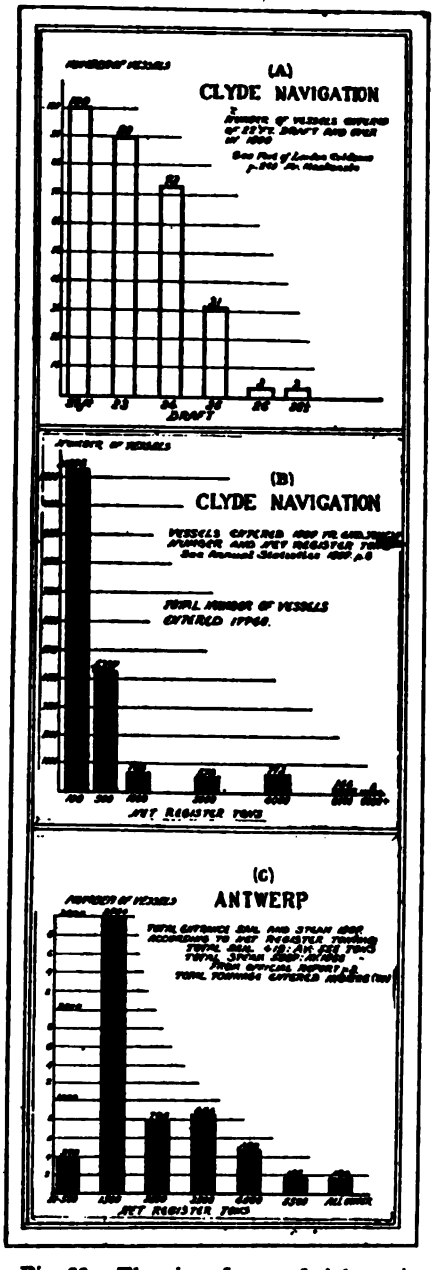



Fig. 33. The size of ocean freighters.

4,000 and 6,000; and only 4 of 6,000 tons and over. Again, in the case of Antwerp, in the year 1907 the total number of vessels entered showed, of sail, 417 with an average net register tonnage of 555 tons; of steam, 5,867 vessels, with an average tonnage of 1,866 tons. As to size, there were of steam vessels 398 with a net register tonnage of 51 to 500 tons; 2,964 with between 500 and 1,500 tons; 796 of 1,500 to 2,500 tons; 854 of 2,500 to 3,500 tons; 480 of 3,500 to 4,500 tons; 185 of 4,500 to 5,500 tons; and 184 of a tonnage over 5,500 tons.

The surprising thing to notice in all this is the small size of the vessels doing the freight service on the sea. These two ports are typical. The same record would be shown by the other great ports. The great leviathans with 35 feet draft and high tonnage are the few passenger boats and men of war. The freight they carry is an insignificant contribution to the traffic of the sea. The average freight boat of the sea is smaller, much smaller than the later and larger boats carrying coal and ore on the great lakes. A canal deep enough for best service in the lakes would carry practically all the world's traffic boats to Chicago.

I asked the traffic managers in the various ports I visited as to the tendency of freight boats to grow larger. There is a well-defined opinion amongst them all that there is at present no tendency for the freight boats to grow larger. It is hard enough now for a 3,500-ton boat to get a cargo and run on a regular schedule. Moreover, it is not necessary to design boats even of much larger size to require more than 28 feet draft. And in the newer models the boat is given a broader beam and greater length in order to increase its carrying capacity rather than giving it a greater draft.

Our location is extremely fortunate in that it gives us three alternative routes for deep water channels to the sea. By the time our country has achieved the attitude of Germany toward the development of internal transportation all three of these routes will be developed.

The first of these routes is that of the Erie Canal. This lies in exactly the line to be of most service, as commerce is now organized, for it leads to New York, where freight opportunities are at present at the very apex of advantage. But we may be sure that this route will not be developed at the present time—for to the natural opposition of the railways will be added the entire opposition of the city of New York and all its mercantile and marine interests.

It would require the unanimous co-operation of all the rest of the country to secure a ship canal on this route against these interests.

The second alternative is a new route the Canadian government has under consideration at this time—a canal which will lead out of the Georgian Bay to Lake Nipissing, thence over the divide and down the Ottawa river to Montreal. The preliminary surveys are made for this venture and the engineers are working out the question of costs. This scheme is of the greatest significance to Chicago, for it will be seen by an inspection of a globe that this route will give Chicago practically a great circle route to Liverpool and the other ports of Northwest Europe, saving 774 miles over the present

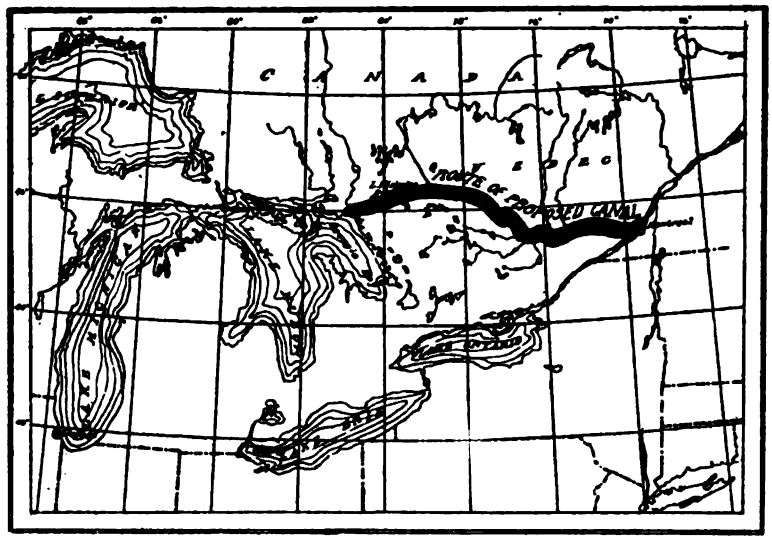



Fig. 34. Map showing the route of the proposed Nipissing Canal.

journey by way of New York. Another very patent advantage to us is that this route will give the Chicago merchant a choice again of playing the advantages of this route against the New York route, under conditions almost certain to assure the best service and lowest rates in the trade with Europe. And this advantage will accrue even if it should not prove advisable to bring ocean vessels through the canal to Chicago. The choice of routes will be enough to assure the Chicago merchants the same advantages they have had up to date in having more than one transportation interest eager to carry their goods.

The third alternative is equally fascinating, and that is the

making of a deep waterway down the Mississippi river to the Gulf. And in this connection we are not serious in calling 14 feet a deep waterway. Fourteen feet will do wonders, as the development of the Rhine and other rivers of Northwest Europe proves. Our first move is to make a 14-foot channel play its proper part in traffic, then deepen it as the needs of traffic require.

We have not begun to appreciate our opportunities in water transportation on this great flat plain of ours. On a basis of 3 feet minimum draft we have in America now over 14,000 miles of navigable waterways, and this is measuring in smooth lines, not counting sinuosities. But our possibilities are vastly greater than this, for many streams not now navigable will furnish good navigation when canalized. It will be suggestive to place a map of the canals and navigable rivers of a part of the plain of Northwest Europe (Fig. 35) side by side for purposes of comparison, with an equal area in the plain about Chicago (Fig. 36). Then let us reflect that the Rhine carries more freight to and from the hinterland than the railways do, and let us think what our waterways, if given the same attention and opportunity as in Germany, could be doing for Chicago and the region tributary. For Chicago has, in the waterways present and potential of the Mississippi and St. Lawrence valleys, what is better than half a dozen Rhine rivers, ready to serve Chicago as the Rhine does Rotterdam.

Chicago's greatest opportunity in commerce looking to the future is toward the south. The distance from Chicago to New Orleans is just about the same as from Chicago to New York. The development of deep water transportation along the Mississippi axis will give Chicago a direct water highway to the vast future markets of South America. The completion of the Panama Canal will open the markets of the Orient to us. On the trade with South America the Chicago merchant may save on his freight the cost and time of the Chicago-New York trip. On all the Pacific trade he will save twice that. Thus the Chicago merchant will be independent of New York in all this trade. And he will have an added advantage in a water route to the Pacific ports of America, which will fix the maximum rates on the railway haul to the Pacific coast.

Considering all these opportunities, it is no exaggeration to say that there is no other such brilliant opportunity on earth for merchandising as Chicago offers. With the waterways of the great plain developed for craft of the size and character of the Rhine boats, the Chicago merchants may have absolute control of freight

rates and hence of the local market situation at every town along the Mississippi from St. Paul to the Gulf; on the Missouri river to the Great Plains; on the Ohio to Pittsburg, and on many tributaries to these main streams. And with the deep waterway to the sea, the import and export traffic with all the world may be handled with exactly the same opportunity for controlling the ocean transportation as is enjoyed by New York or Hamburg.

The deep water development of these commercial routes is sure to come. It is only a matter of education. The time we must wait will be short, in proportion as we are enlightened. And in its devel-

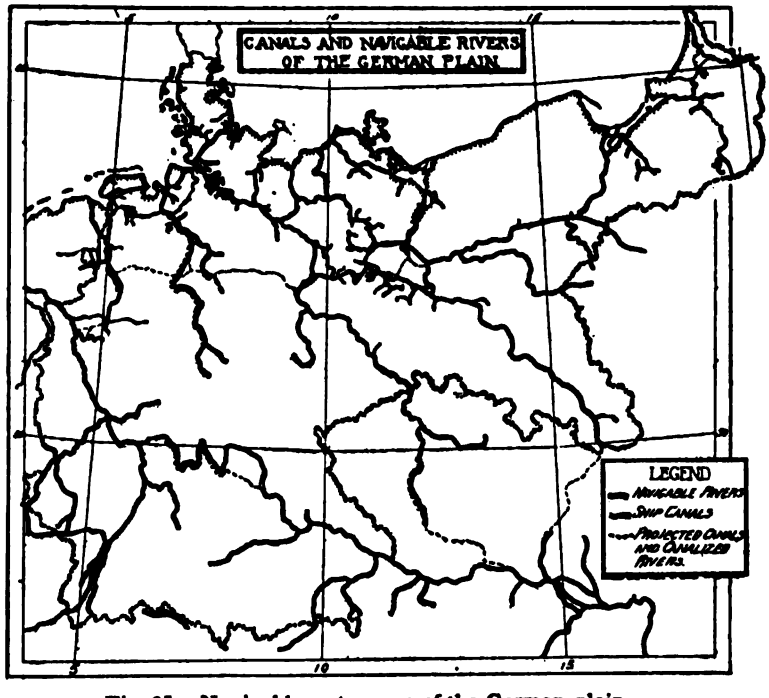



**Fig. 35. Navigable waterways of the German plain.**

opment the merchant and manufacturer of Chicago stands to gain immeasurably over any other possible commercial focus. On the experience of Manchester, Hamburg, Rotterdam and Antwerp in ventures already worked out and demonstrated as successes, it would pay Chicago to construct any one of the great ship canals single-handed and alone *if she could.* But in the nature of the case Chicago may not undertake any one of the ventures any more than Antwerp can. Since she cannot do it alone, it will be the part of wisdom for her to leave no stone unturned, politically or education-

ally, to advance in every possible way the development of any or all of these routes. *Economic freedom consists in having a choice,* and Chicago may just as well have not only an option between rail and water, but between alternative water routes to the markets of the Mississippi basin and to those of the world over seas.

The opportunity to keep our hold upon the present hinterland of Chicago is one few people realize, for we have only barely begun the development of this great area. To see the possibilities of the

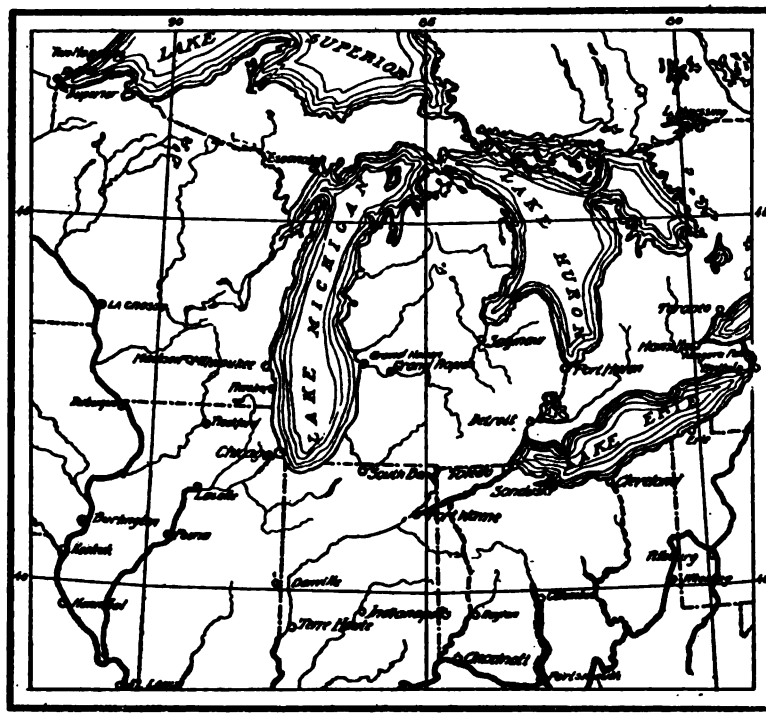



**Fig. 36. A part of the Chicago plain equal in area to that shown in Fig. 35, showing waterways (in heavy lines) at present navigable.**

region commercially tributary to Chicago one must put it alongside the highly developed lands of Western Europe. Climatically the parallel is good. As to mineral resources, the comparison again is fair. As to population, our blood and culture are the same, and standards of living are comparable. So what these European lands are now doing it is fair to suppose we may soon do.

Upon the area which we consider is commercially tributary to Chicago we can superpose the following list of countries, the pres-

ent populations of which are given to show what these lands are doing in the way of supporting people, compared with what our area is doing at the present:

| | |
|---|---|
| Britain | 42,000,000 |
| Denmark | 2,600,000 |
| Germany | 60,000,000 |
| Holland | 6,000,000 |
| Belgium | 7,000,000 |
| Switzerland | 3,315,000 |
| France | 39,000,000 |
| Spain and Portugal | 25,000,000 |
| Total | 184,315,000 |

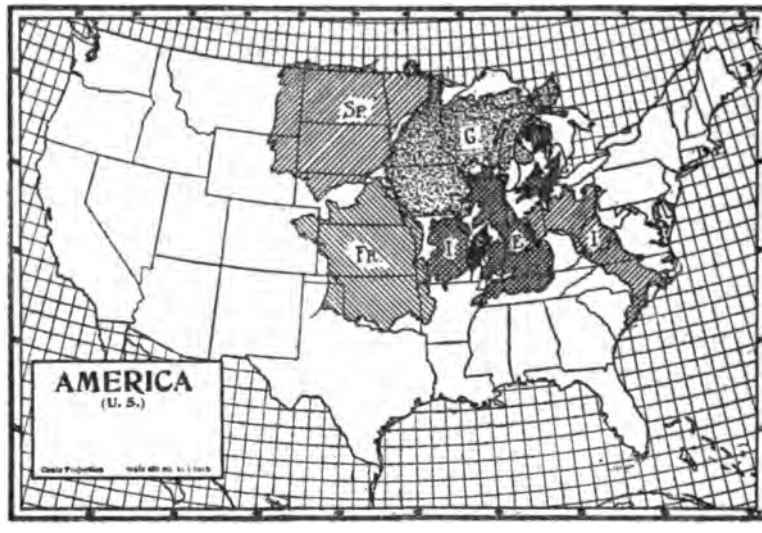



**Fig. 37. The Chicago area with European lands superposed.**

The American States in the Chicago area contain at present a population of 28,000,000. Thus the European countries of about equal area have a population seven times as great. These European countries, with the exception of England, Belgium and Germany, and to a small extent France, feed their people upon their own area. Yet in every case our area covered in this map is far richer and better able to support the large population than the European country is. At the rate our own population has increased the last half century, the 28,000,000 now tributary to Chicago will have become 252,000,000 within the present century. This *rate* at which

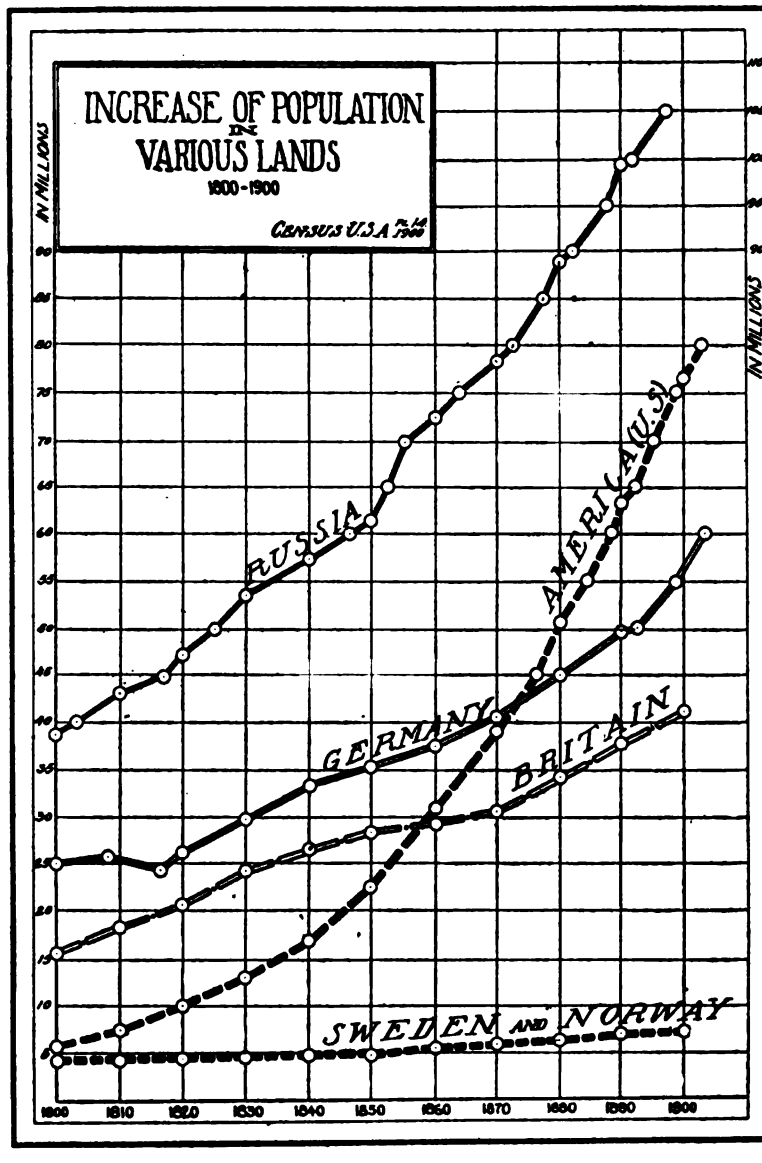


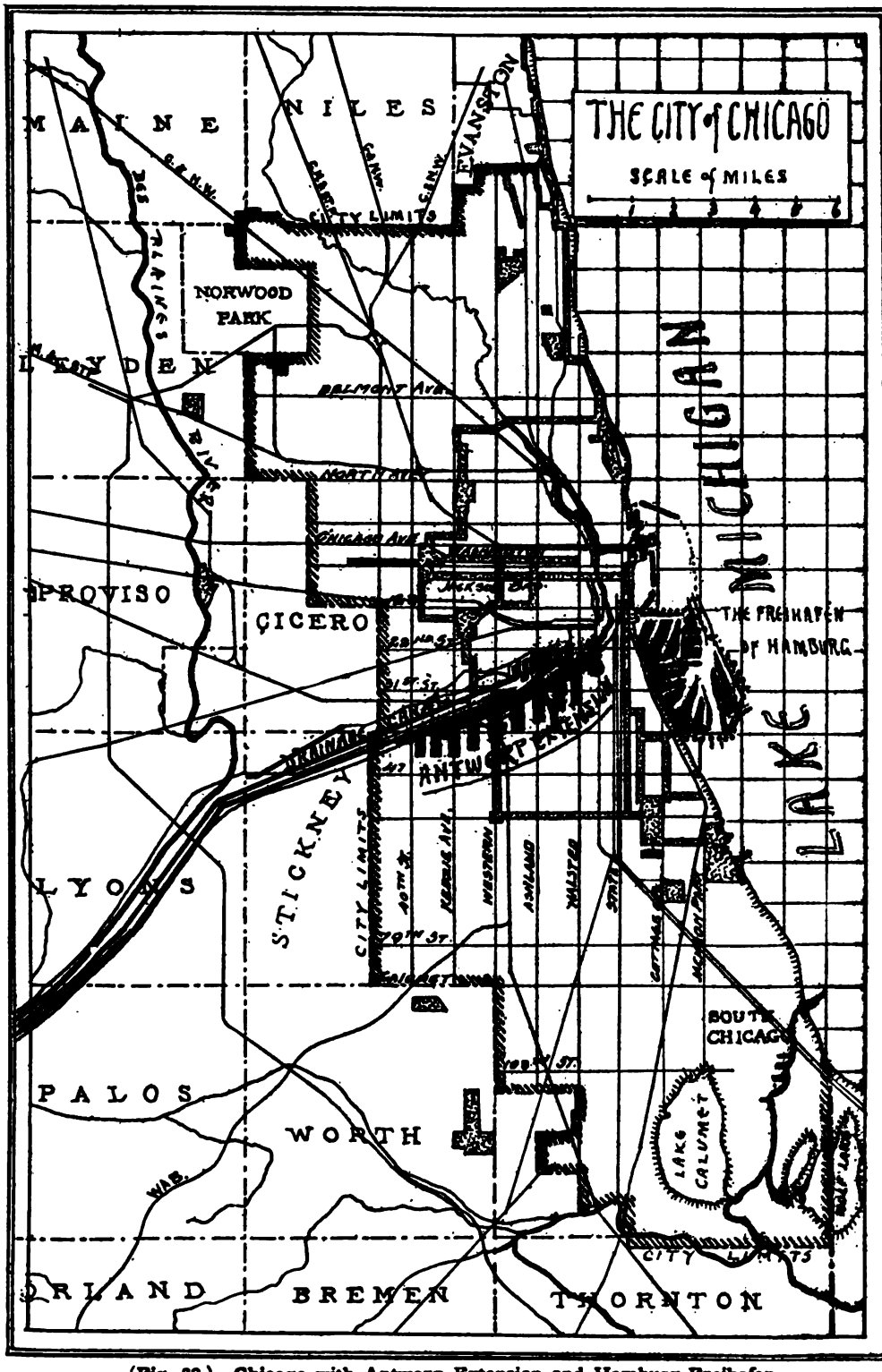

Fig. 38. Increase in population in various lands 1800-1900.

we are now growing may not last. But even if we adopt the rate at which old and stable Germany has increased, the Chicago area will have at the end of the present century a population of 100,000,000. But all over the world the cities are increasing in population faster than rural lands, and the largest cities have the fastest rate of growth. So a very modest estimate for the end of the present century would make Chicago a city of 10,000,000 inhabitants. This is the city, and this is the future it is our duty to plan for now. The possibilities are fascinating.

## 5. Planning for the Future

A mere enumeration of the natural resources of the Chicago hinterland, the scantiest catalogue of advantages Chicago has in her position in relation to commerce with this rich tributary area, the slightest acquaintance with what has been done within a century in the development of this region, must make one an optimist as to the future of Chicago. And we need to have the perspective such a study gives in order to plan at all for the future. With such possibilities in commerce before us how pitiful it seems, to be compromising on a 140-foot channel, and shying at sharp curves and projecting property in the only excuse for a harbor the fifth city in the world can claim for its own. The least that can be done is to plan for an immediate future we know will be ours: a harbor adequate for the ocean traffic a city of our rank will command; provision for the magnificent fleet of river boats we are soon to have. With this point of view let us look at the provision made in some of the world's great harbors for traffic they already have, and make close application to our own map.

Antwerp's present opportunity is only a fraction of what ours is to be within the century. Yet Antwerp has already adopted plans, and reserved the land for a harbor extension which is here shown to scale (Fig. 39) superposed upon the map of Chicago, and which makes our present harbor facilities look very small and cheap. Hamburg's prospects for traffic are not nearly so great as those of Chicago. Yet Hamburg has within a generation created a harbor which is already a candidate for first place among the world's great ports. The water area of the basins at Hamburg is here also shown to scale extending for five miles along our lake front. In the case of Hamburg this harbor area is considered as barely adequate for current commercial needs, and at Antwerp it is fully believed that the area reserved will all be




(Fig. 39.) Chicago with Antwerp Extension and Hamburg Freihafen

needed within the next two generations. Our possibilities of growth and need of dock space are much greater than both of these cities combined. The conclusion is plain, that the whole drainage canal should be looked upon as a harbor for development as a manufacturing region, and suitable provision made for adequate docks and turning basins. But for the commerce of the Great Lakes, and the ocean boats which may come from the East and Northeast, extensive areas on the lake front should be reserved.

The question of bridges in the present river is one which almost puts it out of the question to look for the conversion of the river in the down town section into a harbor at all. No great harbor tolerates bridges. There are none on the Clyde, only one swing bridge on the Tyne, the two high bridges permitting ships to go under them as the bridges on East river, New York, do. The harbor at London is below the bridges. There are no bridges across the harbor at Antwerp, and almost all of the harbor business is below the bridges at Rotterdam. And again at Hamburg, the ocean harbor is wholly below the bridges.

The lake front offers a better site for harbor construction, better located with reference to the needs of the ships and the town, and with the engineering difficulties more simple, and with costs of acquisition lower, than is found for harbor extension at Liverpool or Glasgow, or Manchester or Newcastle, or London or Bristol or Havre or Hamburg. Only Rotterdam and Antwerp of all the great ports compare with it in convenience of location, simplicity and low cost required.

The demands of street traffic are of the first importance. London has carried two great thoroughfares under the Thames, in one case with a 30 foot tunnel over a mile long rather than encumber the river with bridges.

The evidence of all the great harbors shows that streets should not be obstructed, nor ships hampered by bridges. Hamburg's solution is to have canals on the upper river served by low lying craft which can go under fixed bridges. Our grades lie amply high above the river to allow the Rhine type boat to go freely from the lake under the bridges to any warehouse on either branch of the river, and down the drainage canal. Ships might lie at anchor on the lake front. Barges as lighters or even the Rhine boat built for lake service, may serve any warehouse on the river

or on canals leading out from the rivers, without interfering at all with street traffic.

It would be immensely advantageous to the congested business center of the city to be free to expand to north and west with unobstructed streets full width. Fixed bridges offer a splendid architectural opportunity, and the river part of the city might become the most beautiful and attractive part of the town.

If the harbor were established on the lake front the connection with the railway systems could be very easily provided for, as is shown at Antwerp, Rotterdam and Hamburg. Harbor areas providing for water traffic on the largest scale in the world, are served by railways without interfering with the streets of the city any more than our belt lines now do. And Hamburg is laying out now, a new terminal belt railway system, in which the railway tracks are either elevated or depressed, and free from grade crossings. All service is to be electric, and every provision is taken to have the installation efficient and unobtrusive.

In harbor administration the whole list of ports studied shows that greatest efficiency has been coupled with the nearest approach to monopoly in the management of all the service of transportation in the port. Outside of Liverpool, where the national laws make a trust an easy venture, the best examples are Rotterdam, Antwerp and Hamburg, where the harbor affairs are purely and simply a part of the municipal government. It is my conviction that such an organization is much more likely to be permanently successful with us. But in these cities the men chosen as heads of departments are of the highest ability and training, and have the advantage of the best expert advice in all their undertakings. The harbor board or department put in charge of these matters should be given definite and far-reaching powers. Among these powers should be the power to take land by purchase or otherwise for harbor extension or improvement; power to build and operate wharves, docks, sheds, warehouses, railway tracks and other freight handling facilities.

The experience of Manchester shows that such power should be given as would enable the harbor authority if necessary to become a terminal railway company to serve all the wharves and connect with all other railways. Such a terminal railway company would go farther to ensure a proper handling of freight to and from the boats in our harbor than any other provision that could be made.

If such a harbor authority could be so organized as to bring to its service men of the highest ability and experience, men who represent Chicago, and not special interests, men who could have the united support of the brains and wealth of Chicago behind them, Chicago may come to her own; a marvelous commercial plexus, the metropolis of the New World.

Chicago's manifest destiny is plain. It is to be the world's greatest entrepot; importing from every foreign port, exporting to the ends of the earth; with fleets of her own river boats of the Rhine type plying on a grander network of waterways than even Germany has yet planned; with other fleets of ocean going steamers free to go on three different routes to the sea; on a par in the world's trade with New York, London, Antwerp, Hamburg; the magnitude of her trade limited only by the possibilities of her hinterland, the richest on earth. Our future is as great as we are wise enough to make it. Our limitations are human and social, not in the opportunities nature has given us.

# Obstacles to Chicago's Water Shipping Development

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Report to the

Chicago Harbor Commission

By GEORGE C. SIKES

# Letter of Transmittal

*To the Chicago Harbor Commission:*

GENTLEMEN—I submit herewith a report on Obstacles to Chicago's Water Shipping Development, based on interviews with shippers and vessel men, on a study and observations of local conditions, and on information gathered in visits to Milwaukee, Cleveland, Detroit, Buffalo and Duluth.

Respectfully submitted,

GEORGE C. SIKES.

Chicago, October, 1908.

# Obstacles to Chicago's Water Shipping Development

## Chicago's Attitude Toward Water Shipping

The wonder is, not that the volume of shipping business in the Chicago harbor, as distinguished from the Calumet harbor, has fallen off, but rather that it has not declined more. The persistence of traffic under the discouraging conditions that exist indicates a desire on the part of shippers to make use of water transportation. This desire is further indicated by the tendency of mercantile concerns to seek locations on the river, and by the recent development of facilities for lighterage service in the Chicago harbor.

The general attitude of the Chicago authorities and public toward water transportation has been one of indifference. Shipping has been allowed to look out for itself, for the most part. Obstacles to development have been permitted to exist long after their ruinous effect had become evident. The tunnels were an injury to navigation for years before they were removed. Center pier bridges still exist as barriers to water commerce. Most of those already taken out to give way to bridges of the bascule type were removed by the Sanitary District Board as an incident in the work of securing the necessary flow of water. Such river widening and deepening as has taken place, or is planned, aside from that done by the federal government, has likewise been carried out by the Sanitary District as an incident to the main purpose of that body, which is sanitation. The Sanitary District is without lawful authority to spend money for the purpose of promoting navigation, and the city government has expended almost nothing in recent years in furtherance of this object. The city is indeed building a very few new bridges. It has brought about, after many years of agitation, the lowering by the street car companies of the LaSalle, Washington and Van Buren street tunnels, which were very serious obstacles to navigation, and responsible for driving much water business away from Chicago. The Sanitary District has substituted bascule for center pier bridges at twelve points as follows: State, Dearborn, Randolph, Harrison, Taylor, 18th, Canal, 22d, Main and Loomis streets; Ashland avenue and the Chicago Terminal Transfer Rail-

road bridge. It is also planning to take out the center pier structure at 12th street. It has projected and partially executed a plan for making the south branch of the Chicago river 200 feet wide from Lake street to the point at Robey street where it connects with the Sanitary District channel. The federal government has built turning basins and is now engaged in deepening parts of the river not comprehended within the scope of the Sanitary District's work.

The aforementioned improvements, however, in no sense suffice to meet Chicago's need for better water terminal facilities. While there is some agitation for betterment on the part of citizens' organizations, the creation of the Harbor Commission is the first serious recognition of the need for an official program for comprehensive water terminal improvement. The Sanitary District, while it intends carrying to completion the work of widening the south branch to 200 feet, and plans building a new bridge at 12th street, has no intention whatever of taking out the center pier bridges in the main river, which constitute serious obstacles to navigation. No greater flow of water, it says, is needed in the main river for sanitary purposes. Nor has the Sanitary District Board, or any other local official body, any plans for improving navigation in the north branch which stands sorely in need of improvement. The federal government is dredging the north branch as far as Belmont avenue to a depth of 20 feet, but widening and straightening at some points are also necessary. The Wilmette channel, which the Sanitary District is digging, begins at Belmont avenue, the point at which navigation ceases, and the channel from Belmont avenue to Lake Michigan at Wilmette will be spanned by fixed bridges. The city authorities hope some time to take out the center pier bridges at Rush, Clark, Wells and Lake streets, but no specific date is suggested.

Not only is the community without program for harbor improvement, but other projected undertakings of a public nature will, if carried through, still further restrict the already limited facilities available for dock purposes. The proposed boulevard link carrying Michigan avenue across the river east of Rush street, if authorized, will cut right through two docks and thus destroy terminal facilities now used by four transportation lines. The Goodrich Transportation Company, one of the oldest boat lines on the lakes, will be driven by this undertaking from its location east of Rush street on the south side of the river, and the officials of the company are at a loss to know where they can dock. The Dunkley-Williams Com-

pany, docking on the opposite side of the river, will also be driven out. The Goodrich Company and the Dunkley-Williams Company carry freight as well as passengers. The former operates vessels between Chicago and Milwaukee twelve months in the year. The passenger steamboat, the Manitou, and Barry line steamers that load and unload passengers at the same dock, must likewise seek other locations.

It is typical of Chicago's attitude of indifference toward water shipping that these boat lines are regarded in many quarters as private enterprises that must take care of themselves.

Ordinarily cities lack the power to deprive a railroad or a group of railroads of their terminal facilities. Even if Chicago possessed the power, the proposition to take away from a railroad its terminal facilities, without a thought as to whether or not the line could provide itself with other facilities to enable it to do business, would be condemned as contrary to wise public policy, unless the health of the community or some other consideration more important than commercial development should require the action. If Chicago is not prepared to deal with water transportation as public business, akin in nature to railroad business, instead of treating it like strictly private enterprises, of course the city can expect no further shipping development.

Bridges are also frequently suggested at Wabash avenue and at LaSalle street. A bridge at Wabash avenue would destroy the Graham & Morton dock. One at LaSalle street would prevent the further use of the Anchor line dock, except by much smaller boats than even now tie up there

If Chicago seriously cares to encourage water shipping it will, when planning new bridge construction that will destroy docks, give careful consideration to the question as to what the ousted boat lines are to do for new dock facilities.

The chief champions heretofore of better water terminal facilities have been the vessel men directly interested and a few of the larger shippers. It is significant that the demand of these men has been for "river improvement," and the demands even in that line have been very modest. There seems to have been little effort to interest the general public in the larger phases of the problem of proper harbor development with which the Harbor Commission is attempting to cope. There seems to have been small realization of the power of public opinion in a matter of this kind, and of the necessity of bringing it to bear upon the official authorities as a

means of securing results. In fact, in their pessimism, the vessel men themselves, in order to get moderate immediate benefits, have used their influence to forestall more important improvements. Three bridges are now being constructed over the North branch of the river just above the mouth, which give a clearance at the water line of about 100 feet. Obviously this span is too narrow. The resident government engineer, Col. Bixby, was disposed to refuse assent to such narrow span and instead to insist on a width of 140 feet. Not only was there no public opinion to support him in this position, but the vessel men actually petitioned him and the war department to agree to the narrower width, because it would afford better facilities than existed at the time.

The new State street bridge, built by the Sanitary District, has a clear span of 140 feet. But because it is located near a bend in the river, and the abutments project into the stream from the convex bank, this bridge is an obstacle to navigation. It is, of course, much less objectionable than the center pier bridge which it replaced, but the men who built it admit that the span should have been wider from the viewpoint of navigation. There was at the time, they say, no public opinion to justify the expenditure of the larger sum required to give a wider span to the bridge.

In interviewing vessel men and shippers I have been impressed with the tendency of each to regard the city's harbor problem from the special point of view of the person's particular line of business. There are exceptions. But to a large extent the coal man, the lumber man and the grain dealer are thinking chiefly of how to secure better facilities for handling each his own particular commodity. The merchant is interested in package freight accommodations and the vessel man in ease of access to the harbor and freedom of movement within it. But there has been no agency or group to correlate the different interests, including those of the general public, and represent them all effectively.

There is no city in the land in which public opinion is a more vital factor than in Chicago. To bring about important public improvements in this community the proper procedure in the formulation of underlying policies and the education and marshaling of public opinion in support of those policies are as essential as correct engineering and legal work. Moreover, each problem has to be considered with reference to other problems that are occupying public attention.

These are things which the champions of "river improvement"

seem not to have realized. They have not made the general public appreciate their needs and sense the fact that their needs were public needs.

During the past ten years the traction question has been the issue that has most engrossed the public mind, and the tunnel lowering question was closely intertwined with the solution of the traction question. The champions of river improvement seem to have been entirely indifferent to what popular opinion in Chicago regarded as important phases of the traction question. In demanding the lowering of the tunnels, no interest was manifested in the possible bearing of this matter upon the subject that was uppermost in the popular mind. As a consequence, little impression was made on the situation by the river improvement interests and tunnel lowering was made to wait until a solution was in sight of the question that had the right of way in the public mind.

The present seems an especially opportune time for the inauguration of a successful movement for securing adequate water terminal facilities for Chicago. The procedure is to outline a comprehensive harbor policy, that shall provide for future as well as present needs, and take account of other related public improvements that are up for consideration. The people at large must then be familiarized with the main features of the program and led to understand that the problem is one having important public aspects; that it is not primarily a matter affecting a few private interests. Much of the technical expert work of preparing detailed plans can be executed while the process of public education is going on.

## The Passenger Boat Business

In taking up the question of facilities for shipping in Chicago, I deal with the passenger boat business first, not because it is more important than water freight carriage, but because it furnishes the clearer situation for treatment.

There are five boats, besides those that belong in the launch class, that do an exclusively passenger business from the port of Chicago. These are the Northland, of the Northern Steamship Company, running between Chicago and Buffalo; the Manitou, of the Northern Michigan Transportation Company, operating between Chicago and Mackinac and intermediate points; the Christopher Columbus of the Goodrich Transit Company, operating between Chicago and Milwaukee; the Theodore Roosevelt of the Indiana Transportation Company, operating between Chicago and Michigan

City in the day time and making a moonlight run on the lake in the evening; and the Pere Marquette No. 18, which has been in service as an excursion boat during the past summer, making day trips to Waukegan and conducting moonlight runs on the lake in the evening. The Goodrich Transportation Company, the Graham & Morton Company, the Northern Michigan Transportation Company, the Dunkley-Williams Company, the Indiana Transportation Company, and the Barry Transportation Company all operate boats giving a combined passenger and package freight service. These lines confine their operations to Lake Michigan, but some of them have through route and joint rate arrangements with outside boat and rail connections. The Benton Transit Company operates a fruit and package freight line between Chicago and Benton Harbor without offering passenger facilities.

Lack of direct street car connections with docks is one of the obstacles to the development of the passenger boat business in Chicago. The Graham & Morton dock is over a block from the nearest street car line, and other car lines and the elevated roads are still further removed. The distance from street car or elevated lines to the passenger boat landings clustered about the Rush street bridge is four or five blocks at the least. It is distressing to see persons encumbered with baggage and accompanied by small children covering this distance on foot. The passenger docks located on the slip at the foot of Michigan street are much more inaccessible. To get to or from them one must pass through territory that is fear inspiring, especially after nightfall. The fact that boat companies attempt to make use of docks so inconvenient for passenger purposes is itself one of the most convincing indications that Chicago's facilities are inadequate.

Charges for towing boats to and from their landings are a serious burden. The tug bills of the Pere Marquette amount to $60 a day and those of the Theodore Roosevelt to $40 a day. As the Pere Marquette carries passengers for 25 cents each for the round trip, it will be seen that 240 passenger fares are necessary to cover the towing bills. This is a fixed charge which must be met while the boat is in service, whether the traffic be heavy or light. The location of docks where they could be approached by vessels under their own steam without tug assistance would be a great boon.

The time consumed in getting in and out of the harbor is another handicap. The Pere Marquette and the Theodore Roosevelt, which make evening trips into the lake of from 2½ to 3 hours' duration, often use up from a quarter to a third of that time between

their docks and the harbor entrance. The Theodore Roosevelt, which is only 289 feet long, has just room to squeeze in between Clark and Dearborn streets, where she docks. The manager of the company owning her says it is the intention to build another boat in the near future, and he would like to make it considerably larger than the Roosevelt, but he has no place to dock the larger boat. Hence he must give the order for the smaller vessel. The manager of the Indiana Transportation Company also reports that the electric railway lines terminating at Michigan City would like to enter into through route and joint rate agreements with his company with respect to package freight business, a request he had been obliged to refuse because of the inadequate terminal facilities in the Chicago harbor.

Bridges and bridge hours constitute additional obstacles.

The most important consideration is that such facilities as are now to be had are limited. The existing boat lines are unduly circumscribed and are without opportunity for expansion. The Interstate Commerce Commission, in the case of Benton Transit Company v. Benton Harbor-St. Joe Railway & Light Company, No. 1372, p. 549, found, speaking of the Graham & Morton dock in Chicago, that "the least adequate of its facilities is its wharf in Chicago." And yet the Graham & Morton dock, for convenience, ranks comparatively well among the boat landings of this city. It is almost impossible for a new boat line to get a foothold in Chicago because of inability to secure dock accommodations. Those established most recently are paying 20 per cent of their gross freight receipts for the use for freight purposes of unsatisfactory terminal facilities in the Chicago port. Some have given up the struggle. The steamer Eastland, built for use in Chicago, is now operating out of Cleveland. If contemplated plans for new bridge construction go through, the available dockage facilities of the city will be considerably reduced, and long established boat lines will be at a loss to know what to do for quarters.

Under present conditions, the status of the Theodore Roosevelt and the Pere Marquette is uncertain. By the terms of an old law boats must be allowed to tie up and to land their passengers where those boats dock. Although the city gives these vessels permits for their particular locations, it is not clear that it has the legal right to drive other boats out if they should be tied up at points assigned to these boats. The adjoining property owners and tenants have sought to drive the vessels away as nuisances. It will be seen, therefore, that the managers of these excursion steamers do

business under difficulties. To get accommodations at all, they are obliged to stay where they are not wanted.

The City of Cleveland is a new passenger and package freight boat, operating between Cleveland and Detroit. It is said by its owners to have cost $1,250,000. The boat is a side wheeler, 444 feet long and 96½ feet wide. It has seven decks, elevator service and many other features of elegance and comfort. Every room has a telephone and when the boat is in dock at Detroit or Cleveland connections are made so as to furnish telephone communication between the boat and the city. It is of value to any city to have a boat of that type entering its port. The City of Cleveland would have very great difficulty in finding dock room in Chicago. She could not get by the Rush street bridge, the larger draw of which is only 73 feet.

Although of less value to the city than water freight carriage, it is not easy to overestimate the importance of the passenger boat business. Lake riding signifies much for both health and pleasure. To many of Chicago's visitors, especially those from interior points, the chance for a trip on Lake Michigan constitutes one of the city's greatest attractions. The development of the passenger business helps to bring into the field boats that also carry a large amount of package freight, and tends to relieve the situation in times of railroad freight congestion.

The passenger boat business of Chicago is growing, in spite of obstacles. According to the statistics of the federal vessel inspector's office, which for the purpose of indicating passenger traffic by ports are somewhat misleading and not strictly reliable, the number of passengers reported for Chicago is approximately two million, or more than for any other port on the lakes, except Detroit. The figures for that city are about seven million. Detroit has passenger docks easily accessible to the people. In addition, it affords more points of interest to be reached by short water trips. Among the attractions is Belle Isle Park, a beautiful island resort in the river less than a half hour's ride by boat from the downtown city docks.

The suggestion for better terminal facilities finding most favor with the passenger boat men is that for the building of piers into the lake north of the mouth of the river. This suggestion is considered more at length later in this report.

## Bridge Hours

The bridge hours are a great nuisance to the navigation interests, both passenger and freight. The city ordinance forbids the swinging of bridges for two hours in the morning and two hours in the evening. The morning hours for closed bridges are from 6:30 to 8:30; the evening hours from 5 to 7. During these hours boats have to lie by, wherever they may be.

It may be a sound principle that people should have the right of way over freight and that the bridges should be closed to freight boats during rush hours in order to facilitate the movement of human beings over the bridges on their way to and from their homes. But it would seem that a passenger on a boat has as good a right to the common highway at any time as the citizen crossing a bridge on foot or in a street car. The navigable channel is as much a part of the common highway as the street or bridge. There would seem to be no sound reason why three or four thousand passengers on a boat should be kept away from their dock landing for possibly two hours because turning a bridge for two or three minutes would cause delay for that period of time to perhaps a smaller number of persons than the boat carries. During the past summer a Graham & Morton boat loaded with passengers reached the Rush street bridge just after 5 o'clock. She was obliged to wait in the harbor with her impatient passengers until 7 o'clock, when turning one bridge for a very few minutes would have allowed her to land.

The Theodore Roosevelt and the Pere Marquette, which make day excursions, are obliged to stay out until 7 o'clock. It is usually 7:30 by the time they get to dock with their passengers, many of whom are women and children. The lateness of the hour of arrival home, which may be 8:30 or 9 o'clock, greatly mars for many the pleasure and benefit of what should be an enjoyable and health-giving trip. Were it not for the bridge hours, these boats would return at least an hour and a half earlier, and would thus enable their passengers to reach home in time for dinner.

The passenger boats coming into the harbor just after the close of bridge hours are likely to encounter freight boats going out. This causes confusion and delay for both, which would be avoided if the passenger boats were not required to observe bridge hours, and could enter the harbor in advance of the time that the freighters may pass out through the bridges.

It would seem to be a reasonable proposition to ask that bridge hours be done away with for passenger boats, at least from the

mouth of the harbor to Wells street. The traffic is especially heavy on Wells street, which carries both a street car and an elevated line. In addition, it is the main avenue of approach for the Northwestern Railroad passenger station. Only one passenger boat, the Pere Marquette, now docks above Wells street, and the managers of that boat, if they could take her as far as Wells street, probably could arrange to land their passengers east of Wells street and thus not require that bridge to turn in rush hours.

The vessel interests generally, freight as well as passenger, think they are entitled to a modification of the bridge hours. They contend that doing away with bridge hours altogether would inconvenience the bridge-using public much less than is popularly supposed. It would seem that the subject should at least be taken up for careful consideration by the Council Committee on Harbors, Wharves and Bridges, and all interests given a hearing. The shortening by even a quarter of an hour of the time for bridge closing would be an appreciable benefit to navigation. Under the city ordinance the bridge closing hours apply every day except Sunday. Holidays are not exempted. It would seem that boats should be allowed free movement through the river on such generally observed holidays as the Fourth of July and Labor Day, as well as on Sundays.

## The Lake Freight Business

The freight boats encounter a multitude of difficulties in attempting to do business in the Chicago harbor. Their troubles are greater in one respect than those of the passenger boats in that they are obliged to go much further up the river to receive and unload cargoes. In the first place, the largest boats on the lakes cannot enter the Chicago river at all. Those that do get in are beset by the difficulties of a narrow and tortuous channel that increase the liability to damage and consequently raise the insurance rate. The current in the south branch is the cause of very much complaint and is said to constitute the chief basis for the higher rate on coal. Boats regularly charge ten cents a ton more for carrying hard coal from Buffalo to points on the south branch of the Chicago river than they do for cargoes from Buffalo to Milwaukee or to South Chicago. An increase of ten cents a ton means an addition of about 25 per cent to the water rate from Buffalo. Vessel managers generally have an aversion to entering the Chicago river, because of the difficulties encountered, and will go to competing ports in preference if car-

goes are to be had in them on as favorable terms. Bridges and bridge hours and tug bills are more serious burdens to navigation in the Chicago harbor than in any other lake port. Mr. Johnson, Chicago agent of the Anchor line, testified before the commission that the towing bills chargeable to a vessel of his line from the time of entering to the time of leaving the harbor was likely to be $250. He cited one instance where the expense for towing was $320. The time consumed is even a more important consideration. In Duluth vessels can load and unload quickly and it is uncommon for a steamer to require the use of a tug in that port. The package freight boats find the necessity of moving about so much within the Chicago harbor in order to receive and discharge their cargoes objectionable. There are still not enough turning basins. It is difficult to secure satisfactory dock facilities at prices within reason from the boat point of view. The package freighters suffer especially from the inadequacy of warehouse facilities. In Chicago, where a boat takes goods from a railroad, it pays for unloading the car, a usage that prevails in no other port on the lakes. This charge amounts to about 14 cents a ton. While the rate to the shipper is the same from one port as from another, it will be seen that the boat line has an object in diverting traffic if it can to a port where it does not have to meet this charge.

The railroad traffic managers do not undertake to defend this usage. They merely treat its existence as a fact that has developed out of past conditions. It would seem, therefore, that organized efforts on the part of the lake lines to put an end to it might be successful.

An interesting project for furnishing warehouse facilities and better connections between lake and rail lines is that of the Chicago River and Indiana Railroad Company. This company, which operates a switching line, has erected during the summer of 1908 a warehouse 800 feet long by 100 feet wide on land adjoining the Santa Fe slip, near the point where the river joins the Sanitary District canal. It is the idea to have this boat landing the meeting place for lake and rail lines. The Chicago River and Indiana Railroad Company derives its benefit from the project out of the $3 a car switching charge for moving cars to and from the warehouse. Only two railroads—the Santa Fe and the Burlington—are as yet making use of this warehouse, although it is hoped that all may do so in time. The boat lines generally approve of this project. They would sooner have a common meeting place and interchange point with all the railroads than to be required to move about from one dock house

to another to put off and take on cargo. The railroads, however, are not so enthusiastic over the project. They have to pay the switching charge, which would be saved if the boats called at their own dock houses. They also argue that in times of congestion they may lose control of their cars if taken off their own lines. A further objection is that the railroads are put to less trouble and expense in loading and unloading cars at their own terminals than is the case where they make use of a common dock house.

It would seem that the railroads would be more likely to enter into arrangements for the joint use of a common dock house if the plan were worked out under public direction, with railroad co-operation, instead of being launched as a strictly private undertaking.

Duluth clearly has the best harbor on the lakes. After it would rank Buffalo. Such harbors as South Chicago, Cleveland and Milwaukee would constitute the next lower class. The Chicago harbor ranks below all these, in point of excellence of facilities. Of course, this was not always so. With reference to the shipping needs of earlier days, the Chicago harbor was the equal of any on the lakes. But the harbor improvements have not kept pace with the progress of shipbuilding, so that with reference to the needs of today our harbor facilities are antiquated and insufficient.

It is contended by some that Chicago and South Chicago constitute one city, and that the shortcomings of the Chicago river harbor are offset by the excellence of the facilities afforded at South Chicago. But South Chicago by no means gains all that Chicago loses. And while South Chicago may serve satisfactorily as a transshipping point for goods passing through this gateway, it does not meet the needs for water terminal facilities of the large portion of the city's population naturally tributary to the Chicago river. While the Calumet river has taken some of the Chicago river business, an examination of the traffic statistics would indicate that it has taken by no means all that Chicago has lost. It is very likely, too, that much of the Chicago business that might be done by water, if the facilities were better, is handled by the rail lines at higher rates. As business is diverted from lake to rail the tendency develops to take it around rather than through Chicago.

The managers of the regular freight boat lines do not hesitate to say that they divert traffic from Chicago to Milwaukee where they can, because of the greater ease and economy of doing business in that port. A concrete illustration of the inadequacy of Chicago's water terminal facilities is furnished in the action of the International Harvester Company in sending goods from Chicago to Mil-

waukee by rail to be loaded on the boat at that point for water shipment. During one week in August 65 carloads of machinery were thus sent out from the Deering plant, located on the north branch. The explanation is that the difficulty of reaching the Deering plant by boat was too great to warrant the effort.

It is not uncommon for the boats to deliver at Milwaukee carload consignments for Chicago, and have the delivery made by car from Milwaukee to Chicago. This is in cases where the receiving house in Chicago has a location on a switch track.

## Waterways and Terminals

The federal government constructs or improves waterways. It does not supply terminal facilities. Those must be provided, if they are to be had at all, by private agencies or by state or local public authorities. The Hennepin canal, lately completed by the federal government at a cost of approximately eight million dollars, is unused, largely because of the absence of terminal facilities. On the west this canal opens into the Mississippi river, and hence through that outlet has access to river cities with dock facilities. But the eastern terminus is practically in open country and not a point for traffic origin. Major Marshall long ago expressed the opinion that the Hennepin canal could never have much traffic until given direct connection with Chicago.

Proper terminal facilities are quite as important for a transportation route, whether rail or water, as the connecting way between the terminals. A railroad line between New York and Chicago, be it ever so good, would have little value without terminal facilities in the two cities. Railroad expenditures for improvement at the present time are largely taking the form of giving better terminal facilities. The Pennsylvania Railroad is spending an enormous amount, said to be in the neighborhood of one hundred million dollars—or as much as the state of New York is expending to secure a larger Erie canal across the state—in providing itself better facilities, both passenger and freight, for getting into and through New York City. The New York Central is spending $60,000,000 for passenger terminal improvements in New York City.

Monopoly control of terminal facilities gives monopoly control of the transportation business between terminals. This is true of waterways, open to all on like terms, as well as of railways. Competition can have free play on a waterway only in case there is access to the terminal facilities by all boats on like terms.

The railroads provide their own terminal facilities, assisted by the grant from the public for that purpose of the power of eminent domain. By analogy the boat lines are expected at first thought to do the same thing, though it is uncommon for them to be given condemnation powers to that end. In practice, however, the world over, boat lines do not as a rule provide their own terminal facilities.

In continental Europe public ownership of docks is the prevailing custom. In Great Britain the harbor trust idea is the predominant one. In this country the dock facilities in first-class ports are provided either by the public authorities or by the railroads. They are not provided by the boat owners, as a rule. There are important exceptions, of course. New York, New Orleans and San Francisco have public ownership. About three-fifths of the water front of Manhattan Island is publicly owned. Some of the large companies have their own docks, but more lease from the city. In Boston, Philadelphia, Baltimore, Newport News and Galveston the railroads own and control the important docks. Coming to the Great Lakes, it is the same. The railroads control practically all of the terminal facilities of Buffalo, water as well as freight. In Duluth and Milwaukee it is the railroads that furnish the boat lines with dockage. This is partially true in Chicago also. While each boat line entering this city has its own terminal, a large part of the package freight is loaded and unloaded at dock houses provided by the Western railroads.

Handling facilities at terminal points for the bulk commodities that constitute the heavy tonnage of lake commerce—iron ore, coal, grain, lumber and salt—may be provided by the private capital interested in the particular lines of business dealing with those commodities. But when it comes to the miscellaneous cargo, it would seem that satisfactory handling facilities are likely to be provided only by the public or by the railroads. And in Chicago's case it would seem doubtful if the railroads are likely to rise to the needs of the situation, chiefly because of their number and their inability to co-operate on a matter involving the general public welfare.

Milwaukee's excellent terminal facilities for the package freight lines are provided by the Chicago, Milwaukee & St. Paul Railroad. The larger part of the water-borne freight consigned to Milwaukee does not stop there, but is carried to its destination by rail. The interest of the railroad in providing terminal facilities for the water line is to get the rail haul. The interest of the St. Paul road in providing better dock facilities in Milwaukee than in Chicago, and in diverting water traffic from one port to the other, is two-fold.

In the first place, it can handle the business easier in Milwaukee, because the congestion is less there than in Chicago. In the second place, the St. Paul road has but one important competitor in Milwaukee—the Chicago & Northwestern Railroad. Water traffic in that port must be divided only between the two roads, whereas the competitors for it in Chicago will be more numerous. It is much the same with roads to other outlets where the competitors are fewer. The Santa Fe, for example, has an interest in diverting business to Galveston, because it has to compete with fewer rivals for the haul from that point to and from the Central West.

If Chicago had but one or two railroads, dominating the traffic situation at this point, it might expect the railroads, from self-interest, to develop facilities for connecting water lines. But because it is the great center for many rival railway interests, this city cannot expect any one of these railroads to do for it what the St. Paul road has done for Milwaukee, nor is it likely that all can be induced to co-operate to the same end, at least not without the initiative and directing supervision of the public authorities.

The problem of providing adequate water terminal facilities at Chicago, therefore, must be regarded as one calling for solution by the public authorities.

There are differing views as to the importance of harbor improvement for Chicago. There are those who contend that this city has little to gain from spending money on water development; that the railroads can perform the service better and at not much if any greater cost. It is significant that some persons who have followed the business of water transportation all their lives believe that inland water carriage is doomed to be driven out by the railroad.

The general case of the Railroads vs. Inland Water Transportation presents too large a field for discussion here. The advocates of water transportation make two chief contentions. They say: (1) That primitive waterway development cannot be expected to compete successfully with modern railroads; that waterways, to be effective, must be promoted on a larger scale. (2) That the railroads have deliberately throttled water transportation.

Of course, the Great Lakes are not to be likened to primitive waterways, whatever may be said of the present canals connecting them with the seaboard. Chicago's supremacy is due to the fact that it is the world's greatest railroad center and the railroad centralization at this point would seem to be due in turn to the city's strategic location with reference to lake transportation. Deprive Chicago of its advantages with reference to water carriage and there would be

danger of inland rail centers approaching it in importance. The rail rate from New York to Chicago, which is the basing rate for adjoining territory, is influenced by the water rates, and is lower than the rail rates to points not on the water. The Interstate Commerce Commission, in regulating rates, recognizes the principle that cities enjoying water competition are entitled to lower rail rates than points not so advantageously located.

Now, the balance between rail and water rates at Chicago is so delicate that it does not take much to turn the scale one way or the other. Because of the fact that the water haul from Buffalo to Chicago is about four hundred miles further than the rail haul, the cheapness of water as compared with rail carriage is not so marked in the case of Chicago as it is, for example, with Duluth. But while Duluth gets a larger comparative saving by the water haul, it does not offer the same inducements to the railroads. Let Chicago, through its failure to provide adequate harbor facilities, deprive itself of the benefit of water transportation, and it will soon see the railroads doing less to advance its interests, because the incentive to do so will be removed. As long as the water route is available, the railroads must be on the alert to serve Chicago well and cheaply. It is significant that the present movement for the general increase of railroad freight rates comes at a time when the railroads have the water rate situation between Chicago and New York well in hand, as will be shown later in this report.

The point sought to be made here is that the improvement of water terminal facilities is of great importance, not only because of the traffic that can actually be handled, but even more as a means of stimulating the railroads to do their utmost for Chicago. Another consideration of weight is that the total freight handling capacity of the city is greatly increased over what would be the case if dependence were placed on rail facilities alone. Water transportation is more elastic than rail, and can expand more rapidly to meet the needs in periods of congestion. When the railroads are unable to do all the business because of its great volume, the vessels on the lakes will greatly facilitate the movement of goods of such ports as are equipped with adequate water terminal facilities.

While it may be true that the future growth of water traffic cannot be predicted with mathematical accuracy and shown to be of such great volume as to warrant tremendous outlays at once for harbor improvement, it cannot be gainsaid that there is more business to be done by water in Chicago than can be handled properly with present facilities. The case would seem to be clear, therefore,

for a comprehensive plan of harbor improvement to be carried out only so rapidly as may be necessary to keep the facilities all the time a little in advance of the actual needs of commerce.

With respect to lines of lake commerce, Chicago's interest would seem to lie most in the direction of increasing the package freight or miscellaneous cargo business.

Iron ore, which constitutes about one-half the total tonnage of lake commerce, is little seen in the Chicago harbor. Nor do we care for it there. The great blast furnaces do not belong in the center of the city. They are better located for all concerned where they are, at South Chicago, Indiana Harbor and Gary.

Chicago is still the world's greatest lumber market, although the arrivals by water have greatly decreased. The water business is still of importance, however, and many lumbermen think the present volume of business may be maintained for a generation or more. At any rate, it is important that the city have facilities for handling such quantity of lumber as may continue to come here, even though no increase may be looked for, owing to the disappearance of the timber supply at points available for water transportation. The place where the lumber is wanted appears to be the Chicago river and not the Calumet. For the year 1907 Chicago received, in round numbers, 2,400,000,000 million feet of lumber, of which 400,000,000 feet, or one-sixth, came by water. Not many years ago the receipts of lumber by water greatly exceeded those by rail.

The coal unloading facilities in the Chicago river are not as good as at other leading lake ports. Perhaps they are as good as are warranted by the condition of the harbor. River improvement might be expected to lead to the introduction of better unloading facilities. While the Calumet river may answer as a trans-shipping point, it cannot meet the needs of Chicago proper as a receiving point for coal for consumption in this city.

The number of grain elevators on the Chicago river is growing smaller. As elevators have been destroyed by fire or other cause they have not been rebuilt. The center of the wheat trade is moving westward and northward away from Chicago. This city, however, while it does not lead in wheat, is still the world's greatest grain market. The center of the corn supply is not likely to move away. Much of the grain storage of the city is on the Calumet river. Except for one consideration it might be a matter of indifference to the community at large whether the grain center be on one river or the other, apart from the question of preserving investments already made. That consideration has to do with the

encouragement of the package freight business. While the total volume of freight east is greater than the volume west, more package freight moves west than east. The package boats, therefore, need grain cargoes east, in part at least. And as most of the package freight comes into the Chicago rather than the Calumet river, it is highly important that there be elevators in the Chicago harbor to supply the package boats with their return cargoes of grain. These boats would find it disadvantageous to be obliged always to go to South Chicago for grain, especially for partial cargoes, after unloading in the Chicago river. This constitutes an argument for encouraging at least a considerable number of grain elevators to stay in the Chicago harbor.

Because iron ore, grain, coal and lumber constitute the principal volume by weight of lake commerce, it is assumed in some quarters that they alone are worthy of serious consideration. The package freight or miscellaneous cargo business, however, is of very great importance. The great dry goods and grocery houses of Chicago actually bring in enormous quantities of merchandise by water. The ability to do so constitutes the principal reason for the preeminence of this city as a wholesale and jobbing center. It is difficult to obtain precise information as to the volume and value of this traffic, because facts of this nature are not freely given to the public by concerns engaged in keen competition with one another.

From the record and decision of the Interstate Commerce Commission in the case of Wyman, Partridge & Co. and others against certain lake and rail carriers, docket No. 1126, certain specific information is obtainable with reference to the business of Wyman, Partridge & Co. of Minneapolis and Marshall Field & Co. of Chicago. For the year 1905 the latter firm brought into Chicago by lake approximately 18,000 tons of merchandise, having an invoice value at points of shipment of about $12,000,000. The lake and rail receipts of Wyman, Partridge & Co. for the same year were 6,000 tons, of an invoice value of $3,000,000.

The receipts of unclassified freight in the port of Chicago—including Chicago and South Chicago—for the year 1905 were 1,098,054 tons. The shipments were 640,042 tons. Of the receipts of 1,098,054 tons, the 18,000 tons belonging to Marshall Field & Co. represented a value of $12,000,000. The total hard coal receipts at Chicago and South Chicago for the year 1905 were 884,057 net tons. At Buffalo September prices, $4.91 a ton, this coal was worth $4,330,719.87, or only a little more than one-third the invoice value of Marshall Field's receipts by lake for the same year. The wheat

shipments by lake from Chicago for 1905 were small, only 5,498,868 bushels. But the larger shipments of 1907, 14,448,231 bushels, had less value than the receipts of Marshall Field for 1905. The corn shipments of 1905 were 44,939,308 bushels. At 40 cents a bushel the value of this corn would be only about 50 per cent more than the Marshall Field receipts by lake. The lumber receipts by lake for 1905 were 423,993 thousand feet. At $20 a thousand, a high price, this lumber would have only two-thirds the value of the Marshall Field lake receipts. The iron ore brought into the port in 1905, principally into South Chicago, amounted to 3,324,320 tons. At $2 a ton this ore would have only a little more than half the value of the Marshall Field receipts.

The entire value of Duluth's traffic for 1905 was:

| | |
|---|---|
| Receipts | $ 31,849,509 |
| Shipments | 74,065,789 |
| Total | $105,915,298 |

The value figures for Chicago's receipts and shipments are not available, but if they were it is evident that Duluth's commerce, despite its greater tonnage, would be comparatively insignificant in value.

Federal government reports (see Monthly Summary of Commerce and Finance) give estimates of value of traffic through the Soo. According to these reports, the value of unclassfied freight passing through the Soo developed from $18,744,600 in 1889 to $170,227,650 in 1906. The value of the iron ore traffic grew from $14,335,492 in 1889 to $121,981,795 in 1906. In other words the unclassified freight through the Soo in 1906, of 1,134,851 net tons, was worth approximately $48,000,000 more than the 35,357,042 tons of iron ore passing through the same channel. The unclassified freight passing both ways through the Soo is about the same in volume as that entering the port of Chicago. Against the 1,134,850 tons of unclassified freight traffic through the Soo in 1906, Chicago had receipts of 1,035,317 tons. For the years 1905 and 1907 Chicago's receipts of unclassified freight exceeded the Soo traffic. It would seem to be a good guess that the unclassified freight received at Chicago would have a higher average value per ton than that passing through the Soo.

Value of the articles handled, as well as tonnage, must be taken into consideration in measuring the value of traffic to a community

The fruit traffic is one form of the miscellaneous cargo busi-

ness that is of special importance to Chicago. In most instances rail carriage is considered preferable to water carriage, unless the latter offers lower rates. But for fruit, water carriage is best in cases where the destination can be reached by a night's run. The lack of the jarring motion of the train and the coolness of the water journey cause fruit carried by boat to arrive in better condition. The fruit belt of Michigan is just about a night's run from Chicago and fruit gathered in the late afternoon can be placed on the dock in Chicago early the next morning, in time for delivery for consumption the same day. As has already been indicated, in the discussion of the passenger boat business, the fruit handling facilities in this port leave much to be desired.

## Suggestions for Improvement

Interviews with vessel men and shippers disclose great variations in views as to the ultimate solution of Chicago's harbor problem. There is to some degree unanimity of sentiment with respect to the next steps in the line of improvement.

Whatever the ultimate solution may be, it is evident that the Chicago river must continue to serve as the harbor for a number of years to come. Therefore it should be improved within moderate limits as speedily as possible. The Sanitary District intends carrying to completion the work of widening the South branch to 200 feet, an improvement of great importance. It also intends replacing the center pier bridge at Twelfth street with a bascule bridge.

In addition to this program all the remaining center pier bridges should be replaced by bascule bridges, especially those at Rush, Clark, Wells and Lake streets.

The point of land projecting into the stream at the forks of the North and South branches and the main river should be condemned and dredged, thus creating a turning basin and giving more room for the movement of vessels. A plan for the improvement of the North branch should be outlined and executed, in much the same way as the Sanitary District devised and has partially executed the plan for South branch improvement. None of these things the Sanitary District intends to do. Its work is to promote sanitation, not navigation. What the community needs now is to have the work of improving navigation entrusted to agencies that can lawfully make navigation the chief aim. This means that the next legislature should be prevailed upon to give the city the financial

power to go ahead with the desired improvements, and that they should be pushed thereafter in the interest of navigation, and not as mere incidents to sanitation.

The managers of the boat lines engaged in the passenger business and in the combined passenger, package and fruit business on Lake Michigan are pretty generally of the opinion that the best thing that could be done to satisfy their needs would be to construct a few piers projecting into the lake north of the mouth of the river.

The area in question is a little far removed from the business center, but on the whole it seems to be the best site available for the purpose. The council has already granted the Chicago Railways company a franchise for a street car line on Indiana street extending the present line on that street to the lake front, and it is announced that the new line will be built next spring. If passenger piers should be built as suggested, the cars might be operated on to the piers, or at least to the pier entrance. Passengers would find it much more convenient to ride directly to the piers by street car, even if the distance be a little farther, than to continue the present arrangement under which car lines leave boat passengers in most instances several blocks from the dock.

As the boats that do a combined passenger and package freight and fruit business desire to handle both classes of traffic at the same dock, it would be necessary to equip some of these piers to handle the package business. It should be the policy to have some open dockage where any boats, on compliance with prescribed regulations and the payment of specified charges, could take on or unload miscellaneous cargo. Such dockage facilities might be supplied in connection with the piers now under consideration.

This location, it is true, is reached by only one freight railroad, the Northwestern, but lighterage and possibly car ferriage, if necessary, could be utilized to facilitate the movement of goods. Freight subways are possibilities of the future. This location is farther removed from South Water street than the present fruit boat landings. But the congestion at the present docks is so great that the fruit men would be willing to go farther if they could thereby be provided with more ample facilities.

No detailed engineering plans nor estimates of cost of the suggested piers have as yet been prepared. That should be done, and if the engineering report is favorable the project should be carried out as soon as possible. The facilities these piers would afford are very much needed.

Most of those who declare themselves in opposition to an outer

harbor for Chicago, meaning thereby a great lake front freight harbor, concede the desirability of passenger piers on the lake front.

The two next steps in the line of harbor development would seem to be (1) river improvement, and (2) the construction of piers on the lake front north of the mouth of the river.

The ultimate solution of Chicago's harbor problem presents many difficulties. If I might venture an opinion on that proposition it would be that the solution cannot be definitely indicated at this juncture. Time and the trend of developments must serve as guides. The possibilities would seem to be four in number, as follows: (1) To depend upon the Chicago river to furnish adequate harbor facilities both for the present and the future; (2) To close the Chicago river for large shipping, utilize it for lighterage purposes only, and let the Calumet river serve as the harbor for the entire city. In this event, the Sag cut-off connecting the Calumet with the Sanitary District canal would serve as the northern outlet for the Lakes-to-the-Gulf waterway, if constructed; (3) To build a great harbor on the lake front; (4) To dig a navigable channel in the vicinity of Twenty-second street connecting Lake Michigan and the river and develop the harbor along the Sanitary District canal.

I do not believe the Chicago river with its narrow and tortuous channel, its multitude of bridges, and its current, all of which constitute permanent obstacles to navigation, can ever make anything better than a third-class harbor. Nor can such a channel be a satisfactory outlet for the Lakes-to-the-Gulf waterway. If Chicago wants a first-class harbor and waterway outlet it can not place dependence on the river alone. Nor does it seem likely that such pier space as can be provided at the river mouth will suffice to meet for all time Chicago's needs in the line of water terminal facilities.

As to the second plan, while Calumet development is to be favored, the Calumet river cannot satisfy the needs of Chicago proper for water terminal facilities. A railroad line to this city would not think of being satisfied with a terminal at South Chicago only. The terminal must reach the center of heaviest traffic. Water transportation, to amount to much, must take cognizance of the same principle. The water route, like the railroad, must have its terminal where the business is. A water route with a terminus at South Chicago only cannot compete advantageously for Chicago traffic with railroads terminating near the center of the city.

The lake front plan, and the project for a harbor along the sanitary canal with a cut-off to the lake at Twenty-second street, both present striking advantages and serious difficulties. One in-

volves taking the railroads to the harbor, and to a degree revolutionizing settled transportation if not industrial conditions. The other means taking the harbor to the railroads and to the industrial area. As to whether either is capable of practical realization, and as to which is preferable, are questions the decision of which must be influenced by time and future developments. Surveys and detailed study of the two plans by engineering experts must precede attempts to decide the question intelligently. Pending that decision, it is obvious that the right to use portions of the lake front in the future for harbor purposes should not be surrendered.

## Railroad Control Over Lake Transportation

For the transportation of the bulk commodities that constitute the greater portion of the tonnage of lake commerce — iron ore, grain, coal and lumber — there is keen competition among the lake carriers. Under the stress of this competition, rates for carrying the great bulk commodities have gone down markedly during the past twenty years.* Despite these reductions in rates, it is the testimony of men familiar with conditions that the vessel business on the great lakes for a period of years past has been profitable.

Chicago's greatest interest in lake transportation is that between this city and Buffalo. The traffic consists principally of grain and package freight east and coal and package freight west. The importance of the package freight business to Chicago has already been pointed out.

Now the package freight business between Chicago and Buffalo is handled exclusively (with a single exception to be discussed later) by boat lines owned by railroad companies. Any vessel that is equipped for the service and can get the orders from the shipper may carry ore, grain, coal and lumber. That fact doubtless explains the reductions in rates on these commodities. But only boats owned by the railroads may engage in the package freight business between Chicago and Buffalo. If these two cities were both destination points for traffic, of course non-railroad vessels could not be excluded from competition. But Buffalo is not a destination point. It is a transfer station. Goods reaching Buffalo by lake must go east by rail or canal. Likewise, freight from the east reaching Chicago water-borne must be brought to Buffalo by rail or canal. The railroad makes with its own boat lines a through route and a joint rate

*For tables of lake freight rates for a series of years past, see Monthly Summary of Commerce and Finance, December, 1907, pages 1210-11.

from Chicago to the eastern destination, or vice versa. The local rail rate between Buffalo and the eastern destination is so high that little would be left the independent boat for its lake haul after paying the local rate for the rail haul. Moreover, the railroad would not give the independent boat the benefit of its dock facilities in Buffalo, either for discharging or taking on cargo. The independent boat would be required to unload at some other dock and team the goods to the receiving station of the railroad. To make matters still worse, the railroads own nearly all the water front property in Buffalo available for dock purposes. Much of it lies idle and unimproved. The deliberate intent of the railroads to dominate the lake traffic situation through the control of the Buffalo water front can hardly be mistaken.

But, it will be asked, What about the Erie canal? The railroads dominate that, too, so far as possibilities of through traffic are concerned. Besides, the canal is so small and the number of boats operating on it is so few as to dwarf its importance. A few years ago the boats on the canal numbered four or five thousand. Today there are scarcely more than 350 or 400 serviceable boats in operation. It is hardly to be expected that many new boats will be put in service until the enlarged canal is ready for use.

At best the methods of Erie canal business are primitive. The boat owners are for the most part men of narrow outlook. The business has not been organized along modern lines. Until recently. the legal limit of capitalization for companies engaged in the canal business was $50,000. The limit is now $4,000,000.

The principal business of the canal boats is carrying grain east. Such through canal and lake service for package freight business as exists is supplied by the lake lines chartering canal boats and making rates to the shipper for the through service. In that way the lake lines, which are owned by the railroads that are supposed to be competitors of the canal, control the Erie canal service that is of interest to the Chicago shipper.

The canal boat owners, with a few exceptions, are organized into a union. The claim is made — and there is much evidence to support the claim — that the boatmen's union acts in harmony with the railroads and refuses to have business dealings with independent lake boats that may seek to give a through lake and canal service in competition with the rail owned lake lines.

The foregoing indicates how the railroads east of Buffalo practically control the package freight business between the seaboard and Chicago and other western lake ports.

Now as to the significance of that control.

The lake lines operating between Chicago and Buffalo are as follows: Erie and Western Transportation Company (Anchor Line), owned by the Pennsylvania railroad; Western Transit Company, owned by the New York Central; Lehigh Valley Transportation Company, owned by the Lehigh Valley railroad; Union Steamboat Company, owned by the Erie railroad. The Baltimore and Ohio and the Delaware, Lackawanna & Western railroads also maintain a lake and rail service, but do not own their own boats. The Western Transit Company supplies the boat service for the Lackawanna road, and the Union Steamboat line furnishes that for the Baltimore & Ohio. The Mutual Transit Company, owned jointly by four railroads (Lehigh Valley; Delaware, Lackawanna & Western; Erie, and New York Central), operates between Lake Erie and Duluth, but sends no boats to Chicago. The foregoing are known as Standard lake lines. In addition there are two differential lines, that is, lines that maintain somewhat lower rates because of their roundabout routes and slower service. The Canada Atlantic Transit company is a Canadian concern, owned by the Grand Trunk railroad. It operates boats between Chicago and Depot Harbor, in Georgian Bay. The other differential line, the Rutland Transit Company, now controlled by the New York Central railroad, is the lake connection of the Central Vermont railroad. The boats of this line operate through the Welland canal and Lake Ontario and make their terminus at Ogdensburg, N. Y. The Chicago & Duluth Transportation company, operating between Chicago and Duluth, carrying iron ore one way and package freight the other, is independent of railroad control, but is accorded railway connections at both ports which neither it nor any other independent boat line could secure at Buffalo.

The present rates, in cents per 100 pounds, by classes, all rail, from New York to Chicago are as follows:

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 75 | 65 | 50 | 35 | 30 | 25 |

The foregoing have been the published all rail rates without change for the past twenty years. Rates have been increased, indirectly, by changes in classification, but as the lake and rail and all rail lines use the same classification, the lake and rail rates have been subject to like increases on this account.

Prior to 1901, the standard lake and rail rates, New York to Chicago, were as follows:

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 54 | 47 | 37 | 27 | 23 | 20 |

In 1901 these rates were raised, the increase being from 54 to 59, first class, and other classes to correspond, and in 1907 there was another advance, bringing the first class rate up to 62 cents. The 1907 raise was partially offset by the carriers, after being required so to do by the Interstate Commerce Commission, taking on certain insurance burdens which they had not borne before.

The present lake and rail rates, New York to Chicago, are as follows:

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 62 | 54 | 41 | 30 | 25 | 21 |

Canal and lake rates from New York to Chicago have also advanced. In 1892 these rates were as follows:

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 30 | 25 | 20 | 18 | 16 | 14 |

At the present time the canal and lake rates, New York to Chicago, are as follows:

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 42 | 36 | 29 | 23 | 21 | 18 |

In other words, while all rail rates from New York to Chicago have remained nominally constant for the past twenty years, lake and rail and canal and lake rates, under railroad control, have advanced markedly. The percentage of increase, on the first class, lake and rail, is approximately 15 per cent; canal and lake, 40 per cent. The canal and lake increases on the classes below the first are in the neighborhood of 30 per cent. These higher rates, together with deteriorating service, explain why shipments by canal and lake are falling off. These increases of rates have taken place while competitive lake rates on the principal commodities of lake commerce have gone down. It would seem to be a natural conclusion that lake rates on package freight have been raised in the interest of the rail carriers that own the package freight boat lines. And it is significant that the movement for a general increase of railroad freight rates comes at the time when railroad control over water transportation to the east, by both lake and canal,

is most complete. It might be added that the commodity rates, as well as the classified rates, have been raised in many instances. The differential between the lake and rail and the all rail rate on flour is now two cents a hundred pounds, where it used to be five cents. The differential on packing house products, like lard and cured meats, has been made so small that these products now move mostly by rail.

The foregoing comparisons of water route rates are with the standard all rail lines. The differential rail lines make rates that are very little higher than the present lake and rail rates.

At the present time, and for several years past, lake rates have not determined railroad freight rates. On the contrary, railroad rates have been the basis for the water rates on package freight on the Great Lakes and the Erie canal and the latter have been raised in order to reduce the difference between the two. This principle of rate making is a fact openly admitted. The following quotation from an article entitled "Transportation on the Great Lakes," by Mr. Walter Thayer, eastern manager of the Erie and Western Transportation Company, in the Annals of the American Academy of Political and Social Science for January, 1908, explains the principle followed in the practical making of rates:

> On account of the slower speed of handling and of the increased number of transfers incident to business shipped by rail and lake, as compared with all-rail, the rates are lower via the lakes than via the all-rail routes.
>
> The present difference is illustrated by the 17½ cent rate per hundred pounds on flour from Chicago to New York, via lake and rail, as compared with 19½ cents per hundred pounds, all rail, and by the west bound rate of 23½ cents per hundred pounds, New York to Chicago, on sugar via rail and lake, as compared with 26 cents per hundred pounds all-rail. The difference between these figures, in each case, is known as a differential. It represents the amount under the all-rail rate charged by the standard lake lines, which experience and long custom has established as being considered the difference between the value of the two kinds of service. The retail prices of granulated sugar and flour, per hundred pounds, being $5.50 and $3.50 respectively, it will be seen what a comparatively small part the cost of transportation must play in the price of such commodities to the consumer.
>
> It is difficult to explain the various rates in existence over the several routes between the East and West; but it should be noted that the service via the lakes requires a transfer, where none is necessary when shipments are all-rail, and that there has grown up a fixed relation between the rates all-rail and the rates rail and lake, based on relative speeds, and that when reductions or advances are made in all-rail rates, consequent reductions or advances follow in the rates rail and lake,

**either eastbound or westbound. These principles of adjustment are further carried out in changes in rates by the differential rail-and-lake lines and the canal lines.**

The various standard lake lines were primarily considered as feeders for their rail connections, and in order that other railroads not equipped with lake lines may not reap the advantage of the tonnage thus provided, through pro-rating arrangements have been made only between the lake lines and their rail owners, or such other railroads as the owners of the lake line think it profitable to connect with.

The foregoing discussion shows that by far the largest part of the tonnage of the lakes consists of ore, coal, grain, etc., handled in bulk by vessels ready to go from port to port for the highest compensation they can secure for their services. On account of the great quantities handled, and the ease with which it is loaded and unloaded, and also on account of the fact that the government has provided a free way and free harbors, the rates for transportation on the lakes are so low as to make unfair a comparison of those rates with average charges per ton per mile via all rail lines.

The bulk freight handled on the Great Lakes consists almost exclusively of raw materials which can be moved at such low rates as to exclude competition by all-rail routes. With the package freight business the situation is different and there is active rivalry between the rail and water lines. The charges for package freight made by rail and water lines must be approximately equal, because the difference in cost of the services by competing routes is relatively small.

Of course, the all rail service is preferable to lake and rail or canal and lake service. The incentive to water transportation is economy. If the water rates are to be fixed by the competing rail carriers at a point that just measures the disadvantages of the water service, the railroads not only will secure the business, or most of it, but the value of the water route as a regulator of rail rates disappears entirely. One merchant said to me that the lake rates had been brought to a point where there was little if any incentive to ship by water; that the value to Chicago of water transportation was merely that it afforded the city just so much additional facilities in periods of traffic congestion.

The grocery house of Sprague, Warner & Co. has canning factories in New York state, which were located near the banks of the Erie canal in order to get the advantage of water transportation of canned goods to Chicago, where the concern has a warehouse located on the river. But of recent years the canal and lake rate, as compared with the all rail rate, has not been such as to make the water route attractive.

I said that all the package freight boats operating between Chicago and Buffalo were owned by the railroads, with one exception.

I will now consider that exception, the Jesse H. Farwell of the Pacific Despatch line. The Pacific Coast Borax Company has a plant on the South branch of the Chicago river. It brings to that plant large quantities of borax from its refinery located near the water in New Jersey. Mr. W. H. Follett, mayor of Tonawanda, N. Y., owns or controls some thirty-five or forty canal boats, which he operates independently of the Erie Boatmen's Union. The Jesse H. Farwell and the Follett line of canal boats operate together and thus form a through canal and lake route for bringing borax from new Jersey to Chicago. The saving to the borax company from this arrangement in keeping rates down is considerable. The Pacific Despatch line is able to carry a small amount of package freight in addition to borax, but not enough to influence the situation materially. The Jesse Farwell can not make like arrangements with canal boat owners who are members of the Erie Boatmen's Union, nor will the railroad owned lake lines make through route arrangements with the Follett line of canal boats.

Having become masters of the package freight business between Chicago and the seaboard, lake and canal as well as lake and rail, the railroads now appear to be striving to secure like control over the grain movement east. This year, for the first time, the railroads are charging more for carrying from Buffalo to the seaboard grain that is taken to Buffalo by boat, than the proportionate share of the all rail haul from Chicago to the seabord. The effect of this action has been to promote the movement of grain all rail, where it has not brought a diversion of traffic through Montreal. The boatmen's union on the Erie canal, in seeming disregard of the interests of its membership, has rigidly maintained the rate on grain by canal from Buffalo to the seaboard at five cents a bushel for the season of 1908, where the rate has been considerably lower in recent years. The result is that the greater proportion of the Erie canal boats are lying idle while the grain is moving east either all rail or is diverted through Montreal. The canal boats belonging to Mr. Follett of Tonawanda are an exception and are carrying all the traffic they can handle.

Perhaps the grain situation can best be explained through the presentation of the following letter to certain railroad traffic managers from Mr. W. M. Hopkins, manager of the Transportation department of the Chicago Board of Trade.

(COPY.)

BOARD OF TRADE OF THE CITY OF CHICAGO.
Transportation Department.
W. M. Hopkins, Manager.

Chicago, July 3, 1908.

Mr. D. W. Cooke, General Traffic Manager, Erie R. R., Chicago, Ill.
Mr. G. H. Ingalls, Freight Traffic Manager, N. Y. Central Lines, Chicago, Ill.
Mr. W. N. Babcock, G. W. F. A., D. L. & W. R. R., Chicago, Ill.
Mr. E. J. Henry, G. W. F. A., Lehigh Valley R. R., Chicago, Ill.
Mr. Wm. Borner, G. W. F. A., Pennsylvania Co., Chicago ,Ill.

Dear Sirs:

EX-LAKE RATES ON GRAIN VERSUS ALL-RAIL PROPORTIONS EAST OF BUFFALO.

Attached hereto I hand you a statement showing ex-lake rates on grain, domestic and export, and all-rail proportions easterly from Buffalo, destined to Atlantic Seaboard points; also, rates from Lake Huron and Georgian Bay Ports to Montreal, Quebec and Portland, Maine.

You will observe that the ex-lake rates from Buffalo exceed the all-rail proportions to the extent of the following amounts, in cents per hundred pounds:

| | WHEAT | | CORN | | OATS | |
|---|---|---|---|---|---|---|
| TO | Domestic | Export | Domestic | Export | Domestic | Export |
| Boston | 4.86 | 2.89 | 4.94 | 2.2 | 5.61 | 5.44 |
| New York | 2.16 | 1.64 | .7 | .95 | 3.63 | 4.19 |
| Philadelphia | 3.61 | 2.16 | 2.15 | 1.44 | 4.5 | 4.56 |

You will also observe that the ex-lake rates from Buffalo to Boston and New York for export exceed the ex-lake rates from Lake Huron and Georgian Bay ports to Montreal and Portland for export to the extent of the following amounts in cents per hundred pounds:

Wheat ..... 3.34
Corn ..... 3.68
Oats ..... 3.13

We understand that the divisions of the all-rail rates via the Grand Trunk and Canadian Pacific roads are substantially on a mileage basis, and, if this is true, it is manfest that the all-rail proportions from Lake Huron and Georgian Bay ports to Montreal and Portland are materially higher than the ex-lake rates for the same service, a condition just the reverse of that with the American lines from Buffalo to the Atlantic Seaboard.

There are two distinct conditions created by the present adjustment of rates:

First, as relating to export business.

The American lines have apparently ignored Canadian competition and are endeavoring to maintain a much higher basis of rates through Atlantic Seaboard ports than obtains through the ports reached by the Canadian lines.

From a railway standpoint this would not seem to be a sound economic proposition, as the result will be to increase the traffic and facilities via the Canadian lines at the expense of the American lines, and a competition will be created by the attitude of the American lines that in a few years will have a material effect on the revenue of the American lines east of Buffalo.

It should not be overlooked that the increased production of grain in the Canadian Northwest in the last few years has been enormous. Six years ago the Canadian Northwest raised about eight million bushels of grain. Last year its production was in the neighborhood of eighty-five millions.

As it has no domestic markets that will absorb any considerable volume of this grain, it follows that a very large portion of the Canadian crop must be exported. This grain enters into direct competition with American grain and under the system of rates as now prevails American grain cannot enter European markets until this Canadian surplus is absorbed.

Second, as to the domestic situation.

We do not contend that the all-rail carriers have not a right to meet lake and rail rates if they elect to do so, but, when this is accomplished, as in the present instance, by advancing a proportion or part of a rate for an all-rail haul of a through lake and rail service and exacting a higher rate for precisely the same haul on business covered by through all-rail rates made in competition with and to meet lake and rail rates, we have serious objection to this method of rate making and its effect.

When you consider that there is a common ownership east and west of Buffalo for a substantial part of the railway mileage between Chicago and New York and that the lake transportation for package freight is controlled by these same interests east of Buffalo, it would look as though there was a deliberate plan on the part of the railways to so adjust their rates as to drive the independent lake carriers out of business and force the movement of grain all-rail, controlling to themselves at the same time the handling of package freight through vessels owned by them.

I do not assert that the railways had this in mind, because I do not know, but I do assert that that is the effect of the present adjustment of rates easterly from Buffalo.

This market is deprived of an advantage that we ought to enjoy by reason of our location on the lakes. There ought to be a reasonable difference between the lake and rail and all-rail rates that should fairly represent the difference in service; but, as before stated, we do not contend that the rail carrier has not a right to meet lake and rail rates, but, when this is done by such a division of the rates as now prevail, we believe that we can sustain our grounds for objection.

For a long period of time prior to the present season the rates on ex-lake grain easterly from Buffalo were less than or equal to the east

of Buffalo proportions of the all-rail rates on grain, and it seems to me that that is a fair and consistent position for the lines east of Buffalo to maintain. If the rail carriers up to Buffalo elect to meet water competition to Buffalo, they have a right to do so, but the lines east of Buffalo should not so adjust their divisions as to make it possible for the Western carriers to open up other markets on a lake and rail basis with an all-rail service, and thus create a competition for this market which under a reasonable and fair division of rates should not exist.

We ask that the ex-lake rates on grain Buffalo to Seaboard be limited to the proportion easterly from Buffalo of the all-rail rates. We believe that this proposition is not only equitable to this and other markets located on the lakes, but is directly in the interests of the carriers east of Buffalo as well.

This is an important matter to the Chicago Board of Trade and we would thank you very much to favor us with your views at your earliest convenience.

Yours truly,

(Signed) W. M. HOPKINS,
Manager Transportation Department.

Following is the statement to which reference is made at the beginning of Mr. Hopkins' letter:

| East of Buffalo To | | WHEAT | | | CORN | | | OATS | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Ex-Lake | | All Rail | Ex-Lake | | All Rail | Ex-Lake | | All Rail |
| | | Cents Per Bu. | Cents Per 100 lbs. | Cents Per 100 lbs. | Cents Per Bu. | Cents Per 100 lbs. | Cents Per 100 lbs. | Cents Per Bu. | Cents Per 100 lbs. | Cents Per 100 lbs. |
| Biston | —Domestic | 8. | 13.33 | 8.45 | 7.5 | 13.39 | 8.45 | 4.5 | 14.06 | 8.45 |
| Boston | —Export | 5.5 | 9.17 | 6.28 | 4.75 | 8.48 | 6.28 | 3.75 | 11.72 | 6.28 |
| New York | —Domestic | 6.5 | 10.83 | 8.67 | 5.25 | 9.37 | 8.67 | 4. | 12.5 | 8.67 |
| New York | —Export | 5.5 | 9.17 | 7.53 | 4.75 | 8.48 | 7.53 | 3.75 | 11.72 | 7.53 |
| Philadelphia | —Domestic | 6.5 | 10.83 | 7.22 | 5.25 | 9.37 | 7.22 | 3.75 | 11.72 | 7.22 |
| Philadelphia | —Export— | 5.2 | 8.67 | 6.51 | 4.45 | 7.95 | 6.51 | 3.55 | 11.09 | 6.51 |
| East of Lake Huron and Georgian Bay Ports | | | | | | | | | | |
| Montreal, Que. | —Domestic | ---- | ---- | ---- | 7.5 | 13.39 | ---- | ---- | ---- | ---- |
| Portland, Me. | —Export | 3.5 | 5.83 | ---- | 3.25 | 5.8 | ---- | 2.75 | 8.59 | ---- |

EAST OF BUFFALO RATES.—All-rail are proportions of through rates from Illinois and are based on divisions via Red Line.
All-rail include proportion of elevation expense at Chicago, also proportion of switching expense at Chicago.
Ex-lake includes elevation expense at Buffalo.

EAST OF LAKE HURON AND GEORGIAN BAY PORTS.—To Montreal include elevation expense at Lake Huron and Georgian Bay ports, also a steamer or elevator at Montreal.
To Portland include elevation expense at Lake Huron and Georgian Bay ports.

It is evident that providing better harbor facilities is not the whole of Chicago's interest in lake transportation. The eastern gateway must be kept open as well, if this community and others on the lake are to derive the full benefit of their location with reference to water transportation. The possible remedies are two, both of which should be invoked.

1. The Interstate Commerce Commission should have the power to require rail carriers to make through route and joint rate arrangements with all responsible boat lines, on like reasonable conditions.

2. Relief must be sought through the greater use of the enlarged Erie canal, or other water routes, when completed.

As to the first suggested remedy, the Interstate Commerce Commission now has the power to require a railroad to make a through route and joint rate arrangement with a boat line where no satisfactory through route exists. But that would not help the situation as between Chicago and eastern points by way of Buffalo, for in the purview of the statute there are existing "satisfactory" through routes. The principle of equal treatment for all, however, requires that any responsible boat line shall be accorded the same through route arrangements that are given any other boat line.

As to the second suggestion for relief, not a great deal can be expected from the Erie canal in its present form. The enlarged Erie canal, however, should be a great boon to Chicago and other western lake ports. But the work of construction is proceeding very slowly. The following figures concerning the progress of the work are taken from a map issued during the past summer by officials in charge of construction:

| | Miles |
|---|---|
| Work under contract | 134.0 |
| Additional plans completed | 107.1 |
| Plans over 75 per cent completed | 43.2 |
| Other plans in progress | 161.0 |

The law under which the work of enlargement is being carried on was passed in 1903. Construction began in 1905. The canal authorities have encountered difficulties in making progress. Perhaps they are doing all they can under the circumstances. But the feeling among vessel men and shippers in Buffalo with regard to the early completion of the canal is decidedly pessimistic. The authorities in charge of construction do not make predictions as to when the enlarged canal will be ready for use. Perhaps the pres-

sure of public opinion could hasten progress. Chicago can do something to help create the necessary public opinion.

The Canadian government is planning deeper water routes to the seaboard, which may prove of great importance to all western lake ports.

## Lack of Vessel Ownership in Chicago

Chicago is not a vessel-owning city. A comparatively small amount of Chicago capital is invested in craft that navigate the lakes. In proportion to their population and wealth, Cleveland, Detroit and Buffalo have much larger investments in lake shipping. This fact may explain in part why our harbor facilities have been permitted to deteriorate in comparison with other lake ports. Large investments of capital in an industry are a great stimulus to public interest in the welfare of that industry. Even the newspapers of Chicago give much less space to shipping news than do the papers of other ports on the lakes. The Chicago papers give considerable space to railroad, insurance and other special lines, evidently because they have many readers who want information on these subjects. By the same token, they presumably print little lake shipping news because they think few readers are specially interested in that topic. More vessel ownership in Chicago would tend to produce a change in this respect.

Vessel ownership seems to go with interest in lines of business affiliated with water transportation. Cleveland's interest in the coal and iron business has led it to own vessels for carrying those commodities. Detroit, as the greatest passenger port on the lakes, has seen its capitalists lead in passenger boat ownership. Many lumber boats are owned in Chicago because of the pre-eminence of this city as a lumber market. Doubtless Chicago merchants would be investors in package freight boats were it not that the railroads monopolize that line of lake business. When the enlarged Erie canal is ready for use it would seem that Chicago merchants would invest in lake and canal boats intended to furnish through transportation service between this city and the seaboard.

Aside from harbor improvement, about all the public can do to encourage home ownership of shipping is to provide more liberal tax laws and perhaps to enact incorporation laws designed to meet the needs of boat companies. At the present time boat companies in this state must organize under the general incorporation law, whereas the railroad companies are given a separate law.

In Illinois boats are taxed as personal property. Minnesota and Indiana have laws providing that boat companies, in lieu of other taxes, shall pay annually three cents for each ton of its net registered tonnage. This tax is not only small is amount, but it has the merit of definiteness. While the Ohio tax laws are similar to those of Illinois, the vessel owners of Cleveland register their boats in the small Ohio ports that pursue the policy of assessing vessel property at a small proportion of its value.

When Wisconsin changed its tax laws a few years ago, the Goodrich Company, an old Wisconsin corporation, reorganized under the laws of Maine and registered its vessels at the port of Duluth.

There would seem to be no good reason for treating real estate that may be owned by a boat company different from other real estate. But the attempt to tax the vessels as personal property at their full value simply drives the owners to register them at other ports. The value of an attempt to introduce a more liberal tax system for boat companies, which probably would call for constitutional changes in this state, would be chiefly psychological, as tending to demonstrate the friendly attitude of the public mind toward the development of lake shipping. Under a more liberal tax system, the community would derive more revenue from shipping than it does at the present time, because now very few vessels register from this port, even when owned here. Even though the matter be not one of prime importance in itself, it should be the policy of Chicago to favor the registration of boats from this port.

## Additional Inquiries Suggested

There are three lines of inquiry closely related to the subject of harbor development, each of which calls for more thorough study than the Harbor Commission can give to it. The first is that of railroad terminals in Chicago; the second, the proper location for the fruit, vegetable and dairy produce business now centered in South Water street; the third has to do with the utilization of street cars for express and package business.

The railroad terminals of Chicago are very badly arranged, and the facilities afforded are unsatisfactory. The problem is very difficult of solution and for that reason the subject is deserving of study by a body of experts that should give attention among other things to the need of better correlation of rail and water terminal facilities.

The buildings in South Water street are antiquated and unsuited to the needs of the business carried on there. The quarters are cramped and modern facilities are lacking. Change of location is not likely to be brought about by private initiative. The subject is pre-eminently one calling for careful study by the public authorities, especially as the selection of a proper location must be made with reference to adequacy of transportation facilities, both rail and water.

Chicago is behind many other cities with respect to the utilization of street cars for other than passenger purposes. This subject is intimately related to that of harbor development because, if a plan can be worked out for using street cars at night, and to some extent during non-rush hours of the day, for carrying express matter and packages, that service should prove valuable in connection with boat traffic. This development is certainly coming sooner or later, and it would seem to be the part of wisdom to determine by preliminary expert inquiry what is likely to be the best line of development for the public.

# The Volume and Trend of Traffic To and From the Central West

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Report to the

Chicago Harbor Commission

By GEORGE G. TUNELL

# Letter of Transmittal

*Chicago Harbor Commission,*
*740 The Rookery, Chicago, Illinois.*

GENTLEMEN:—The accompanying report is submitted in compliance with your request for a discussion of certain aspects of Chicago's harbor and railway terminal problem.

Yours truly,

GEORGE G. TUNELL.

Railway Exchange, Chicago, November 12, 1908.

# The Volume and Trend of Traffic To and From the Central West

## Introduction

In his communication to the City Council, which led to the appointment of your Commission, Mayor Busse said:

"The time has come when Chicago must decide whether it will depend for the future entirely upon the harborage afforded by the Chicago river and the Calumet river, or whether it should not take steps to utilize at least some portion of its lake front for shipping purposes."

If a lake front harbor will promote the business and other interests of the city such a reservation should be made. If, however, by the expenditure of the same amount of money, the Chicago river and the Calumet river can be made to serve the traffic needs of the city equally well, then no reservation should be made, as it would seriously interfere with the grand plans that have been formulated for beautifying our city.

It is my belief that the Chicago river and the Calumet river can be made to serve the freight traffic needs of this port and the Central West better and cheaper than a lake front harbor.

This is not a hasty conclusion formed on brief reflection and superficial examination of the facts. It is a conviction reached after extensive and prolonged study of the movement of traffic to and from the Central West and extended consideration of the future productive possibilities of this region.

Before discussing the outer harbor question, and the problems bound up with it, let us consider the traffic this port has had, the traffic it has lost, the traffic it has gained and the traffic it may reasonably expect to have in the future.

By pursuing this course we shall discover what improvements will yield results and what expenditures are likely to prove abortive. Additions and enlargements should be adapted to the traffic we already have and to the traffic we can reasonably hope to gain.

I shall not reason about our problem by analogy for this method of reasoning is often misleading. The analogy may not run on all fours. The grain traffic on the Rhine has been growing

and now greatly exceeds the movement by lake from Chicago. It does not follow, however, that harbor improvements will greatly stimulate the movement through this port. This is true because the great manufacturing districts along the Rhine need more grain than can be raised at home and consequently grain imports and the grain traffic on the Rhine are growing.

Chicago's position is quite different. Home consumption is growing rapidly and there will be less and less grain left for shipment for eastern and foreign consumption. The Rhine manufacturing districts have passed through zero, representing production and consumption in equilibrium; we have passed the high water mark of exportable surplus grain and are now moving toward zero.

Notwithstanding my confident belief that Chicago will become the manufacturing and commercial metropolis of this continent I do not think the time will ever come when the Chicago river, if made navigable for large boats, combined with the Calumet river, will be found incapable of handling the water borne freight commerce of this port. Of the passenger business I shall speak later on. My opinion rests on the following propositions:

Proposition Number 1.—Lumber and timber production in the regions bordering the lakes long since passed the high water mark and is now diminishing rapidly and will continue to diminish because the forests are nearly gone;

Proposition Number 2.—Home consumption of grain by man and beast will increase faster than production and therefore diminishing quantities will be left for shipment to and from the great primary grain markets like Chicago;

Proposition Number 3.—Anthracite coal is being supplanted by bituminous coal and as the supply of the former is limited and is owned by a few powerful corporations it will be mined slowly and a largely increased movement to this region by lake or by rail cannot reasonably be expected;

Proposition Number 4.—There will be no large increase of receipts of bituminous coal from Pennsylvania, Ohio and West Virginia by lake because Illinois and Indiana possess large deposits of good coal, easily mined and just as near Chicago as the Eastern coal fields are to Lake Erie ports;

Proposition Number 5.—Iron ore goes to South Chicago and in the future will also go largely to Gary and the growing traffic

in this commodity is neither expected nor desired on the Chicago river;

Proposition Number 6.—Building material and sand, constituting a large item of traffic on some European waterways, have never been received here by lake in large quantities and probably never will be, as the home supply of sand is large and stone as good as that found on either shore of Lake Michigan is near at hand;

Proposition Number 7.—Receipts of cement are likely to decrease rather than increase owing to increased production in the states of the Central West;

Proposition Number 8.—Receipts of sugar by water are likely to decrease owing to the increased production of beet sugar in the West.

Although the propositions just recited rest on data which to a greater or less degree are common knowledge, nevertheless, each proposition will be supported by facts and figures even though I risk becoming tedious. This will be done because the trade and industrial changes of the last few years have been rapid and striking, making the latest information the prerequisite of a correct judgment and because the range of the propositions is rather wider than the interest and experience of most persons.

## Forest Products

Proposition Number 1.—The movement of forest products into this port reached its zenith in the year 1882. The ebb that has since set in is not peculiar to this port. It is general and is almost wholly due to the destruction of the forests of white and Norway pine on the shores of the lakes and on the banks of the logging streams flowing into the lakes. The enormous drafts that have been made during half a century on the once seemingly unlimited supplies of Michigan, Wisconsin and Minnesota have in recent years well nigh exhausted the forests near the lakes and on the banks of the streams capable of floating logs. Stream after stream has sent down its last logs.

With the depletion of the forests of white and Norway pine contiguous to the lakes and near the rivers flowing into the lakes, the transportation situation has been radically altered. As the lumbermen have been forced to go farther and farther into the in-

terior, the railroads have found it correspondingly easier to compete with the lake carriers. From the interior mills the lumber generally goes to market by rail, because the cost of shipping by the combined rail-and-water route with its charges for trans-shipment on reaching the water is greater than that by the all-rail lines.

Altered methods of doing business at the mills also in part explain the declining lake movement. It is now the custom to sort lumber where it is sawed and to fill orders of consumers and country dealers directly from the mills. These consignments generally go by rail. Formerly the sorting was done by the wholesalers at the great distributing centers about the lakes, who bought supplies by the cargo and often made a large portion of their profits by a nice manipulation of the mixed stocks received.

The statistics of production of lumber in the states of Michigan, Wisconsin and Minnesota, taken with the facts just stated, show conclusively why our receipts of lumber have diminished. In the subjoined table in addition to the statistics of production I show the receipts of lumber by lake at Chicago and at Milwaukee and the eastbound movement of lumber through the "Soo" canals. I would direct your attention in the table which follows to:—

(1) The successive decline of production spreading from east to west;

(2) The fall of Chicago's lake receipts;

(3) The fact that the decline began a quarter of a century ago and long before the Chicago river became too narrow and shallow for large vessels;

(4) To the fact that Milwaukee which has had a good harbor has not gained what Chicago has lost, in fact has suffered like Chicago, and

(5) To the decline of the lumber business of the "Soo" canals notwithstanding the stimulus of the high prices prevailing up to the end of the navigation year 1907 indicating that the lumber business even from Lake Superior has passed its high-water mark.

PRODUCTION AND MOVEMENT OF LUMBER.
(Expressed in M. Feet.)

| Year | Production | | | Receipts by Lake Shipments | | |
|---|---|---|---|---|---|---|
| | Mich. | Wis. | Minn. | Chicago | Milwaukee | Through the Soo |
| 1880 | 4,172,572 | 1,542,021 | 563,974 | 1,419,974 | 132,614 | 48,635 |
| 1881 | | | | 1,607,823 | 135,590 | 58,877 |
| 1882 | | | | 1,872,976 | 171,674 | 82,783 |
| 1883 | | | | 1,655,719 | 145,807 | 87,151 |
| 1884 | | | | 1,610,165 | 135,921 | 122,389 |
| 1885 | | | | 1,504,186 | 149,156 | 127,984 |
| 1886 | | | | 1,427,796 | 131,787 | 138,688 |
| 1887 | | | | 1,457,173 | 151,751 | 165,226 |
| 1888 | | | | 1,626,408 | 173,665 | 240,372 |
| 1889 | | | | 1,447,390 | 148,201 | 315,554 |
| 1890 | 4,245,717 | 2,817,200 | 1,079,403 | 1,359,921 | 140,273 | 361,929 |
| 1891 | | | | 1,359,315 | 176,184 | 366,305 |
| 1892 | | | | 1,443,760 | 192,448 | 512,344 |
| 1893 | | | | 955,290 | 167,360 | 588,545 |
| 1894 | | | | 1,075,763 | 144,858 | 722,788 |
| 1895 | | | | 1,073,847 | 145,809 | 740,700 |
| 1896 | | | | 779,292 | 119,025 | 684,986 |
| 1897 | | | | 917,212 | 150,332 | 905,612 |
| 1898 | | | | 869,922 | 134,488 | 895,486 |
| 1899 | | | | 793,788 | 156,851 | 1,038,057 |
| 1900 | 3,012,057 | 3,361,943 | 2,341,619 | 590,270 | 139,594 | 909,651 |
| 1901 | | | | 730,691 | 128,691 | 1,072,124 |
| 1902 | | | | 644,076 | 121,332 | 1,091,471 |
| 1903 | | | | 459,848 | 100,565 | 1,003,192 |
| 1904 | | | | 395,646 | 81,852 | 923,290 |
| 1905 | 2,006,670 | 2,623,157 | 1,942,248 | 448,163 | 84,215 | 966,806 |
| 1906 | 2,094,279 | 2,331,305 | 1,794,144 | 428,335 | 72,786 | 900,631 |
| 1907 | 1,827,655 | 2,003,279 | 1,660,716 | 411,947 | 74,927 | 649,320 |

In the year 1882 Chicago received (See Report of Chicago Board of Trade, 1882, p. 118) by lake and almost wholly on the Chicago river:

1,872,976,000 feet of Lumber,
868,279,000 Shingles,
61,417,000 Laths,
2,437,319 Posts,
3,789,278 Railroad Ties,
142,571 Telegraph Poles,
67,092 Cords of Wood,
22,200 Cords of Bark.

The lumber traffic of the Chicago river in the year 1882 exceeded in bulk and nearly equaled in weight the combined receipts and shipments of all commodities for any recent year. The total freight receipts by lake at Chicago proper during the year 1906 amounted to 3,110,804 tons and the total shipments to 1,900,982 tons making a total of 5,011,786 tons. These figures were taken from page 1920 of the Annual Report of the Chief of Engi-

neers, 1907, and were submitted to him by W. H. Bixby, Lieutenant Colonel, Corps of Engineers, U. S. A., in charge of the Chicago harbor improvements.

The products of the forests received on the Chicago river do not amount to one-quarter of what they did twenty-five years ago and leave a gap in Chicago's lake receipts of more than 3,000,000 tons annually.

It is facts such as these that lead me to think that the Chicago river can easily be made to accommodate the traffic of this port. The question really is one of boats and bridges and bends and depth and current; not one of the capacity of the river to accommodate the boats and of wharf space. What is needed is a highway of adequate size to accommodate the vessels of present day dimensions.

## Grain and Flour Traffic

Proposition Number 2.—Home consumption of grain and its products by man and beast will increase faster than production and therefore diminishing quantites will be left for shipment to and from the great primary grain markets like Chicago.

The grain and flour traffic has figured conspicuously in the business of this port since Chicago was a village. In years past it furnished cargoes for a large fleet of vessels and with the decline of the lumber business it became the largest item of traffic moved either out or into the Chicago river.

Can the movement of grain and its products through Chicago be substantially increased? I have expressed the opinion that the movement will diminish and I shall now submit the facts on which my judgment rests.

At the time the soil is first broken up and brought under cultivation it yields its largest traffic in crude products. Usually the subduers of the land have but little money and but little live stock. Consequently, their energies are directed to the cultivation of grain, especially wheat, which is sold in its original form because it yields quick returns.

Gradually, however, the farmers accumulate capital and live stock and begin diversified farming and from year to year convert more and more of their crude products into beef, pork, mutton, milk, butter and cheese. As this transition proceeds the volume of traffic in farm products diminishes, the concentrates not equaling the crude products in bulk and weight.

The rapid increase of our home population has largely increased the domestic consumption of all food products leaving a smaller margin for export.

It will now be shown in greater detail why we cannot expect an increased movement of agricultural products through this port. Of course in years of exceptionally large harvests here and small ones abroad our exports may be large. I speak of general conditions and tendencies.

In the past increased production of grain was the result of bringing wild land under cultivation. But the occupation and subjugation of the lands of the Central West have now advanced so far that nearly all of the high-grade land has been brought under the plow and therefore we can no longer look to vast new areas of fertile land with its bountiful first fruits, to increase or even to maintain the existing surplus of production over our growing home requirements. The rapidity with which the wild lands have been converted into farms is shown by the following table for Iowa showing total land area and area in farms:

TOTAL LAND AREA OF IOWA AND AREA IN FARMS.

| Census Year | Total Land Area Acres (1) | Area in Farms Acres (2) | Percentage of Total Area in Farms |
|---|---|---|---|
| 1850 ..... | 35,575,040 | 2,736,064 | 7.7 |
| 1860 ..... | do. | 10,069,907 | 28.3 |
| 1870 ..... | do. | 15,541,793 | 43.6 |
| 1880 ..... | do. | 24,752,700 | 69.5 |
| 1890 ..... | do. | 30,491,541 | 85.7 |
| 1900 ..... | do. | 34,574,337 | 97.2 |

(1) Statistical Abstract of the United States 1907, p. 19.
(2) United States Census 1900, Vol. V, Pt. I, p. 602.

The above table indicates that from now on increased production of farm products in the states of the Central West must come largely from:

(1) Clearing of heavily wooded and stony lands;
(2) Drainage of low lands;
(3) More extended use of fertilizers;
(4) Use of better seed, and

(5) Substituting varieties of grain giving big yields even though they be of inferior quality, e. g., the substitution of the soft durum or maccaroni wheat for hard wheat.

These changes will come about slowly and not until population presses on subsistence. If the statistics of the Department of Agriculture may be trusted the experience of the last fifty years does not hold out much hope of larger yields of grain in the immediate future. The table which follows shows the average yield by five year periods of the principal grains during the past fifty years:

AVERAGE YEILDS OF GRAIN PER ACRE IN THE UNITED STATES BY FIVE YEAR PERIODS (1).

| Period | Corn Bushels | Wheat Bushels | Oats Bushels | Barley Bushels | Rye Bushels |
|---|---|---|---|---|---|
| 1868—1872 | 27.6 | 12.3 | 29.2 | 23.8 | 13.8 |
| 1873—1877 | 25.4 | 12.1 | 27.0 | 21.6 | 13.7 |
| 1878—1882 | 25.4 | 12.8 | 27.4 | 22.9 | 13.9 |
| 1883—1887 | 23.4 | 11.9 | 27.0 | 21.6 | 11.2 |
| 1888—1892 | 24.8 | 12.8 | 26.3 | 23.3 | 12.9 |
| 1893—1897 | 24.0 | 12.8 | 26.1 | 23.1 | 14.1 |
| 1898—1902 | 23.8 | 13.9 | 29.7 | 24.4 | 15.5 |
| 1903—1907 | 27.5 | 13.9 | 29.9 | 26.5 | 16.0 |

(1) Crop Reporter, January 1908 p. 5, Published by the Authority of the Secretary of Agriculture.

The American farmer does not take to intensive farming with its handwork often performed in a stooping posture or while on the knees. He much prefers to hitch three, four, five or more horses to a machine, mount the seat, crack his whip and have the horses and machine perform the work. In time he will be obliged to change his habits notwithstanding his inclinations, but not while there are millions of acres of unoccupied land in the Canadian Northwest that can be purchased at a small price.

In the states of Illinois, Wisconsin and Iowa and especially in those parts which can be considered immediately tributary to Chicago the wheat crop has been declining and is now unequal to the home demand. That you may be fully acquainted with the striking change that has come about I submit a detailed table of the production of wheat in the forty counties of Northern Illinois constituting the district most immediately tributary to this port.

The table begins with Lake County in the extreme northeastern part of the state and runs back and forth across the state from east to west and west to east ending with Vermillion county.

PRODUCTION OF WHEAT BY COUNTIES IN THE NORTHERN HALF OF ILLINOIS AS REPORTED BY THE FEDERAL CENSUS FOR 1870, 1880, 1890, 1900.

| Counties | 1870 Bushels | 1880 Bushels | 1890 Bushels | 1900 Bushels |
|---|---|---|---|---|
| Lake | 169,135 | 45,729 | 70,477 | 26,100 |
| McHenry | 402,060 | 114,101 | 95,380 | 15,070 |
| Boone | 369,325 | 52,895 | 40,202 | 310 |
| Winnebago | 411,074 | 100,313 | 38,829 | 8,430 |
| Stephenson | 629,512 | 347,376 | 99,624 | 29,000 |
| Jo Daviess | 283,313 | 165,984 | 54,662 | 34,660 |
| Carroll | 419,133 | 252,068 | 46,177 | 25,000 |
| Ogle | 502,618 | 238,609 | 91,289 | 13,690 |
| De Kalb | 396,249 | 75,630 | 80,718 | 1,350 |
| Kane | 189,151 | 41,780 | 30,541 | 6,800 |
| Du Page | 106,789 | 45,094 | 45,829 | 33,950 |
| Cook | 145,200 | 37,043 | 51,126 | 45,320 |
| Will | 197,252 | 50,826 | 36,963 | 3,280 |
| Kendall | 91,930 | 23,781 | 29,181 | 4,420 |
| Lee | 453,053 | 244,713 | 84,296 | 10,990 |
| Whiteside | 457,719 | 195,896 | 44,982 | 25,310 |
| Rock Island | 245,820 | 90,857 | 9,956 | 8,600 |
| Henry | 462,824 | 121,315 | 29,307 | 11,690 |
| Bureau | 465,960 | 264,626 | 99,958 | 9,180 |
| La Salle | 273,874 | 197,152 | 189,144 | 3,080 |
| Grundy | 21,850 | 7,985 | 13,052 | 2,350 |
| Kankakee | 103,946 | 56,818 | 17,431 | 450 |
| Putnam | 28,963 | 42,546 | 20,903 | 3,300 |
| Stark | 124,630 | 43,965 | 10,659 | 60 |
| Mercer | 302,494 | 157,146 | 28,046 | 4,320 |
| Henderson | 230,174 | 218,217 | 121,009 | 2,350 |
| Warren | 192,002 | 132,114 | 41,535 | 2,340 |
| Knox | 275,418 | 155,645 | 118,768 | 980 |
| Peoria | 124,104 | 147,438 | 221,609 | 4,210 |
| Marshall | 107,029 | 61,587 | 24,786 | 670 |
| Woodford | 286,446 | 147,818 | 106,174 | 1,260 |
| Livingstone | 130,545 | 61,499 | 39,908 | 90 |
| Ford | 43,579 | 16,644 | 2,292 | 350 |
| Iroquois | 67,640 | 121,335 | 26,615 | 5,770 |
| McLean | 222,756 | 239,890 | 144,227 | 24,070 |
| Tazewell | 204,827 | 421,954 | 717,427 | 60,930 |
| Fulton | 417,599 | 671,334 | 941,189 | 32,690 |
| McDonough | 310,017 | 355,153 | 313,420 | 4,490 |
| Hancock | 414,128 | 596,319 | 630,997 | 50,910 |
| Vermillion | 294,364 | 761,788 | 264,507 | 108,740 |
| Total | 10,476,011 | 7,122,963 | 5,073,070 | 637,450 |

During the five year period ending with the year 1907 the annual average production of wheat in the three states just named amounted to 46,487,937 bushels. The combined population of these states according to the Federal census of 1900 was 9,122,-445 and according to the estimates for 1906 published by the Federal Bureau of the Census in Bulletin No. 71 the population was

9,885,290. During the year 1907 the average per capita consumption as reported by the Federal Bureau of Statistics of wheat and wheat flour was 6.86 bushels. If the combined population of Illinois, Wisconsin and Iowa had increased to 10,000,000, a reasonable estimate, the home consumption of these three states was 68,600,000 bushels and in round numbers 22,000,000 bushels in excess of the annual average production during the five years ending with 1907.

Let us now take a comprehensive view of the production of the principal cereals and of their home consumption and export. These statistics have a direct and vital bearing on the future movement of grain to and from this city.

As corn is our greatest cereal crop its statistics will be presented first. They were taken from the Statistical Abstract of

QUANTITIES OF CORN PRODUCED IN THE UNITED STATES AND OF DOMESTIC CORN AND CORN MEAL EXPORTED, AND RETAINED FOR CONSUMPTION 1880 TO 1908.

| Year Ending June 30th | Production Bushels | Exports of Domestic Bushels | Domestic Retained for Consumption Bushels | Per Cent of Domestic Product Exported |
|---|---|---|---|---|
| 1880 | 1,547,901,700 | 99,572,329 | 1,448,329,461 | 6.43 |
| 1881 | 1,717,434,543 | 93,648,147 | 1,623,786,396 | 5.46 |
| 1882 | 1,194,916,000 | 44,340,683 | 1,150,575,317 | 3.71 |
| 1883 | 1,617,025,100 | 41,655,653 | 1,575,369,447 | 2.58 |
| 1884 | 1,551,066,895 | 46,258,606 | 1,504,808,289 | 2.99 |
| 1885 | 1,795,528,000 | 52,876,456 | 1,742,651,544 | 2.95 |
| 1886 | 1,936,176,000 | 64,829,617 | 1,871,346,383 | 3.35 |
| 1887 | 1,665,441,000 | 41,368,584 | 1,624,072,416 | 2.48 |
| 1888 | 1,456,161,000 | 25,360,869 | 1,430,800,131 | 1.74 |
| 1889 | 1,987,790,000 | 70,841,673 | 1,916,948,327 | 3.57 |
| 1890 | 2,112,892,000 | 103,418,709 | 2,009,473,291 | 4.85 |
| 1891 | 1,489,970,000 | 32,041,529 | 1,457,928,471 | 2.15 |
| 1892 | 2,060,154,000 | 76,602,285 | 1,983,551,715 | 3.72 |
| 1893 | 1,628,464,000 | 47,121,894 | 1,581,342,106 | 2.89 |
| 1894 | 1,619,496,131 | 66,489,529 | 1,553,006,602 | 4.11 |
| 1895 | 1,212,770,052 | 28,585,405 | 1,184,184,647 | 2.36 |
| 1896 | 2,151,138,580 | 101,100,375 | 2,050,038,205 | 4.70 |
| 1897 | 2,283,875,165 | 178,817,417 | 2,105,057,748 | 7.83 |
| 1898 | 1,902,967,933 | 212,055,543 | 1,690,912,390 | 11.14 |
| 1899 | 1,924,184,660 | 177,255,046 | 1,746,929,614 | 9.21 |
| 1900 | 2,078,143,933 | 213,123,412 | 1,865,020,521 | 10.30 |
| 1901 | 2,105,102,516 | 181,405,473 | 1,923,697,043 | 8.62 |
| 1902 | 1,522,519,891 | 28,028,688 | 1,494,491,203 | 1.84 |
| 1903 | 2,523,648,312 | 76,639,261 | 2,447,009,051 | 3.04 |
| 1904 | 2,244,176,925 | 58,222,061 | 2,185,954,864 | 2.59 |
| 1905 | 2,467,480,984 | 90,293,483 | 2,377,187,451 | 3.66 |
| 1906 | 2,707,998,540 | 119,893,533 | 2,588,099,707 | 4.43 |
| 1907 | 2,927,416,091 | 86,368,228 | 2,841,047,863 | 2.95 |
| 1908 | 2,592,320,000 | 55,063,860 | 2,536,936,140 | 2.17 |

NOTE—Corn meal is reduced to corn at the rate of 4 bu. to bbl.

the United States 1907, page 585, and Commerce and Finance of the United States, June 1908, page 2209, published by the Department of Commerce and Labor. Production is of the calen-

dar year preceeding the government fiscal year which ends June 30. The figures are submitted *in extenso* in order to convey a correct idea of the general movement. By an improper selection of years for contrast it would be possible to prove too much or too little.

You will probably agree with me that the above table shows clearly that home consumption of corn is following closely on the heels of production and that the absolute amount of exports is diminishing rather than increasing. The latter fact I wish you especially to note as I shall return to it a little later.

Although wheat is a much smaller crop than corn still it is of great importance as a larger percentage of the wheat crop than of the corn crop finds its way to the great market towns in its original form or as flour. The following statistics were taken from the Statistical Abstract of the United States, 1907, page 586, and Commerce and Finance, June 1908, page 2210. Production is of the calendar year preceeding the government fiscal year.

QUANTITIES OF WHEAT PRODUCED IN THE UNITED STATES AND OF DOMESTIC WHEAT AND WHEAT FLOUR EXPORTED AND RETAINED FOR CONSUMPTION 1880 TO 1908.

| Year Ending June 30th | Production Bushels | Exports of Domestic Bushels | Domestic Retained for Consumption Bushels | Per Cent of Domestic Product Exported |
|---|---|---|---|---|
| 1880 | 448,756,630 | 180,304,180 | 268,452,450 | 40.13 |
| 1881 | 496,549,968 | 186,321,514 | 312,228,354 | 37.38 |
| 1882 | 383,220,090 | 121,892,389 | 261,327,701 | 31.82 |
| 1883 | 504,185,470 | 147,811,316 | 356,374,154 | 29.33 |
| 1884 | 421,096,160 | 111,534,182 | 309,551,978 | 26.49 |
| 1885 | 512,765,000 | 132,570,366 | 380,194,634 | 25.86 |
| 1886 | 357,112,000 | 94,565,793 | 262,546,207 | 26.48 |
| 1887 | 457,218,000 | 153,804,969 | 303,413,031 | 33.66 |
| 1888 | 456,329,000 | 119,624,344 | 336,708,656 | 26.23 |
| 1889 | 415,868,000 | 88,600,742 | 327,267,258 | 21.31 |
| 1890 | 490,560,000 | 109,430,467 | 381,129,533 | 22.31 |
| 1891 | 399,262,000 | 106,181,316 | 293,080,684 | 26.60 |
| 1892 | 611,780,000 | 225,665,812 | 386,114,188 | 36.88 |
| 1893 | 515,949,000 | 191,912,635 | 324,036,365 | 37.20 |
| 1894 | 396,131,725 | 164,283,129 | 231,848,596 | 41.47 |
| 1895 | 460,267,416 | 144,812,718 | 315,454,698 | 31.46 |
| 1896 | 467,102,947 | 126,443,968 | 340,658,979 | 27.07 |
| 1897 | 427,684,346 | 145,124,972 | 282,559,374 | 33.93 |
| 1898 | 530,149,168 | 217,806,004 | 312,343,164 | 40.91 |
| 1899 | 675,148,705 | 222,618,420 | 452,530,285 | 32.97 |
| 1900 | 547,303,846 | 186,096,762 | 361,207,084 | 34.00 |
| 1901 | 522,229,505 | 215,990,073 | 306,239,432 | 41.36 |
| 1902 | 748,460,218 | 234,772,515 | 513,687,703 | 31.37 |
| 1903 | 670,063,008 | 202,905,598 | 467,157,410 | 30.28 |
| 1904 | 637,821,885 | 120,727,613 | 517,094,222 | 18.92 |
| 1905 | 552,399,517 | 44,112,910 | 508,286,607 | 7.99 |
| 1906 | 692,979,489 | 97,609,007 | 595,370,482 | 14.09 |
| 1907 | 735,260,970 | 146,700,425 | 588,560,545 | 19.95 |
| 1908 | 634,087,000 | 163,043,668 | 471,043,332 | 25.70 |

NOTE—Wheat flour is reduced to wheat at the rate of 4½ bushels to the barrel.

The wheat crop varies less from year to year than the corn crop, owing to the fact that the latter is largely dependent on the appearance of frost and therefore the general trend of events manifests itself more clearly in the case of wheat than of corn. I have no hesitation in saying that I believe you will all agree with me that unquestionably the drift is in the direction of smaller exports of wheat. The significance of this fact will be explained after the statistics of the production and movement of oats have been presented.

Wheat, corn and oats are our great cereal staples and of these oats alone remains for consideration. The statistics of the production and disposition of this crop are of unusual significance. The acreage devoted to the growth of this great animal food has increased much faster than that given to the growth of wheat and corn as will be seen by the following table, the figures being taken from the Statistical Abstract of the United States, 1907, pages 93-95:

| Year | Corn Acres | Wheat Acres | Oats Acres |
|---|---|---|---|
| 1880 ..... | 62,317,842 | 37,986,717 | 16,187,977 |
| 1890 ..... | 71,970,763 | 36,037,154 | 26,431,369 |
| 1900 ..... | 83,320,872 | 42,495,385 | 27,364,795 |
| 1907 ..... | 99,931,000 | 45,211,000 | 31,837,000 |

While the acreage of wheat increased 19.0 per cent from 1880 to 1907, the acreage of corn increased 60.3 per cent and that of oats increased 96.6 per cent. The percentages are of twofold significance. They show that the crops which are in the main animal foods and which are very largely consumed on the farms where raised are progressively putting the wheat crop in the background, which in the past, in moving to distant markets, produced a large traffic for both lake and rail carriers. The crops that go to the Atlantic seaboard states either for consumption or export are the crops of greatest significance to this port from the transportation standpoint.

The statistics showing the whole eastbound movement cannot be presented, because they are not compiled, but the exports will be shown. The Statistical Abstract of the United States, 1907, page

95, Commerce and Navigation of the United States, 1905, page 25, Commerce and Finance of the United States, June, 1908, page 2210, are the sources from which the following table was drawn:

QUANTITIES OF OATS PRODUCED IN THE UNITED STATES AND QUANTITIES EXPORTED, 1880 to 1908. (1)

| Year | Production Bushels | Exports Bushels |
|---|---|---|
| 1880 | 363,761,320 | 766,366 |
| 1881 | 417,885,380 | 402,904 |
| 1882 | 416,481,000 | 625,690 |
| 1883 | 488,250,610 | 461,496 |
| 1884 | 571,302,400 | 1,760,376 |
| 1885 | 583,628,000 | 4,191,692 |
| 1886 | 629,409,000 | 5,672,694 |
| 1887 | 624,134,000 | 440,283 |
| 1888 | 659,618,000 | 332,564 |
| 1889 | 701,735,000 | 624,226 |
| 1890 | 751,515,000 | 13,692,776 |
| 1891 | 523,621,000 | 953,010 |
| 1892 | 738,394,000 | 9,425,078 |
| 1893 | 661,035,000 | 2,380,643 |
| 1894 | 638,854,850 | 5,750,266 |
| 1895 | 662,036,928 | 569,977 |
| 1896 | 824,443,537 | 13,012,590 |
| 1897 | 707,346,404 | 35,096,736 |
| 1898 | 698,767,809 | 69,130,288 |
| 1899 | 730,906,643 | 30,309,778 |
| 1900 | 796,177,713 | 41,369,415 |
| 1901 | 809,125,989 | 37,146,812 |
| 1902 | 736,808,724 | 9,971,139 |
| 1903 | 987,842,712 | 4,613,809 |
| 1904 | 784,094,199 | 1,153,714 |
| 1905 | 894,595,552 | 5,479,308 |
| 1906 | 953,216,197 | 46,324,935 |
| 1907 | 964,904,522 | 4,014,042 |
| 1908 | 754,443,000 | 1,158,622 |

(1) Production is of the calendar years preceding the government fiscal years which end on June 30. The second column therefore begins with the crop of 1879 and ends with the crop of 1907.

Our diminishing exports, especially the declining movement to the upper Atlantic ports, is of vital concern to the lake carriers, because it is for this traffic they can most effectively compete with the railroads. In reaching points south of the lakes the railroads have a decided advantage, their lines being more direct.

The distance from Chicago to Detroit by lake is 634 miles, and by rail but 272; from Chicago to Toledo by lake is 691 miles, and by rail but 244 miles; from Chicago to Cleveland by lake is 739, and by rail but 339 miles; from Chicago to Buffalo by lake is 889 miles, and by rail but 523 miles. In shipping to points not on the lakes the local rail rates from the lake ports to the interior must also be considered. These are, of course, proportionately higher than the through rate.

The movement of grain to interior points for consumption is of great significance also because of the manner in which this business is done. The local dealers' wants are best met by carload shipments forwarded from time to time as his supplies become exhausted. He buys in one of the primary grain markets and ships direct by rail, the modern cargo being too large a unit for his trade. The railroad with its small unit lends itself better than the lake carrier to the elimination of the middleman and his profits and thus serves the ends of modern business.

In late years we have often been told that Chicago has been rapidly losing the proud position she has long held as the leading primary grain market of the world, this sad state of affairs being attributed to a lack of harbor facilities. The situation, however, is not nearly so bad as it has been made to appear, and the diagnosis has generally been faulty, the real cause of our trouble having seldom been reported.

Chicago has held her own remarkably well, even though no allowance be made for the new grain fields that have come into existence in regions remote from this city and near to other ports. If St. Louis, Kansas City, St. Joseph, Omaha, Minneapolis and Duluth had cut into our grain business, as several of them have into our slaughtering and packing business, there would be cause for alarm.

## ANNUAL RECEIPTS OF WHEAT AT THE GREAT PRIMARY GRAIN MARKETS OF THE WEST.

| Year | St. Louis Bushels | Minneapolis Bushels | Duluth Bushels | Milwaukee Bushels | Chicago Bushels |
|---|---|---|---|---|---|
| 1887 | 14,510,315 | 45,504,480 | 17,136,000 | 9,346,756 | 21,848,251 |
| 1888 | 13,010,106 | 44,552,730 | 7,993,000 | 8,129,315 | 13,438,069 |
| 1889 | 13,810,591 | 41,734,095 | 17,136,000 | 7,469,289 | 18,762,646 |
| 1890 | 11,730,774 | 45,271,910 | 15,341,000 | 8,046,462 | 14,248,770 |
| 1891 | 25,523,183 | 57,811,615 | 40,392,000 | 10,846,495 | 42,981,258 |
| 1892 | 27,483,855 | 72,727,600 | 46,661,000 | 15,205,639 | 50,234,556 |
| 1893 | 14,642,999 | 57,890,469 | 32,910,000 | 12,806,319 | 35,355,101 |
| 1894 | 10,066,243 | 55,000,610 | 32,226,000 | 8,101,616 | 25,665,902 |
| 1895 | 11,275,365 | 65,436,390 | 49,599,000 | 9,697,379 | 20,637,642 |
| 1896 | 12,651,248 | 69,568,970 | 58,293,000 | 9,386,036 | 19,933,402 |
| 1897 | 12,067,735 | 72,801,530 | 48,069,000 | 9,526,878 | 28,087,147 |
| 1898 | 14,240,252 | 77,159,960 | 66,413,000 | 13,539,840 | 35,741,556 |
| 1899 | 10,428,163 | 87,961,830 | 54,962,000 | 12,345,383 | 30,971,547 |
| 1900 | 19,786,614 | 83,312,320 | 31,815,000 | 10,848,939 | 48,048,298 |
| 1901 | 20,860,805 | 90,838,570 | 47,001,000 | 13,050,950 | 51,197,870 |
| 1902 | 30,667,212 | 89,762,120 | 39,525,000 | 10,369,593 | 37,940,953 |
| 1903 | 22,533,800 | 86,804,070 | 29,091,000 | 9,031,615 | 27,124,585 |
| 1904 | 22,797,308 | 86,935,960 | 26,635,205 | 8,240,960 | 24,457,347 |
| 1905 | 20,684,439 | 93,263,910 | 31,186,725 | 7,576,600 | 26,899,012 |
| 1906 | 17,361,005 | 80,694,580 | 41,558,151 | 7,832,426 | 28,249,475 |
| 1907 | 17,473,947 | 86,030,990 | 55,300,838 | 8,947,093 | 24,943,690 |

## ANNUAL RECEIPTS OF FLOUR AT THE GREAT FLOUR MARKETS OF THE WEST.

| Year | St. Louis Barrels | Minneapolis Barrels | Duluth Barrels | Milwaukee Barrels | Chicago Barrels |
|---|---|---|---|---|---|
| 1887 | 1,049,864 | 1,355,932 | 27,085 | 2,350,355 | 6,873,544 |
| 1888 | 887,173 | 1,751,249 | 69,972 | 2,427,326 | 6,133,608 |
| 1889 | 1,166,603 | 1,949,186 | 64,919 | 2,379,800 | 4,410,535 |
| 1890 | 1,229,975 | 2,368,277 | 70,302 | 2,401,235 | 4,368,058 |
| 1891 | 1,353,640 | 2,510,676 | 76,788 | 2,537,273 | 4,516,617 |
| 1892 | 1,455,342 | 4,095,047 | 164,133 | 2,695,353 | 5,919,343 |
| 1893 | 1,171,025 | 5,036,555 | 282,223 | 1,873,166 | 4,664,424 |
| 1894 | 1,261,309 | 5,107,215 | 149,704 | 2,209,408 | 4,223,182 |
| 1895 | 1,013,344 | 4,166,155 | 136,045 | 2,698,270 | 3,005,460 |
| 1896 | 1,348,601 | 4,381,665 | 140,268 | 3,196,950 | 2,531,995 |
| 1897 | 1,329,050 | 5,061,440 | 144,342 | 2,217,500 | 2,947,005 |
| 1898 | 1,358,068 | 3,790,015 | 156,885 | 2,579,905 | 5,316,195 |
| 1899 | 1,514,215 | 4,573,930 | 196,702 | 3,165,105 | 5,890,139 |
| 1900 | 1,349,700 | 4,519,540 | 223,102 | 3,012,625 | 9,213,591 |
| 1901 | 2,170,548 | 4,785,300 | 240,779 | 2,919,300 | 10,232,265 |
| 1902 | 2,217,695 | 6,907,765 | 246,241 | 3,661,400 | 7,395,207 |
| 1903 | 2,340,695 | 4,729,300 | 291,651 | 3,307,995 | 7,760,227 |
| 1904 | 2,355,560 | 2,899,600 | 332,093 | 2,301,705 | 8,539,220 |
| 1905 | 2,529,780 | 4,332,300 | 316,828 | 2,516,630 | 7,944,955 |
| 1906 | 2,404,745 | 4,740,090 | 246,154 | 2,967,540 | 9,069,239 |
| 1907 | 2,354,565 | 3,360,300 | 240,010 | 2,803,005 | 9,435,311 |

ANNUAL RECEIPTS OF CORN AT THE GREAT PRIMARY GRAIN MARKETS OF THE WEST.

| Year | St. Louis Bushels | Duluth Bushels | Minneapolis Bushels | Milwaukee Bushels | Chicago Bushels |
|---|---|---|---|---|---|
| 1887 | 16,976,356 | 318,000 | 663,000 | 1,027,306 | 51,578,410 |
| 1888 | 20,269,499 | 220,000 | 955,200 | 1,161,100 | 74,308,908 |
| 1889 | 24,299,751 | 1,699,000 | 2,161,800 | 1,024,175 | 79,920,691 |
| 1890 | 45,000,651 | 1,360,000 | 3,462,310 | 944,200 | 91,387,754 |
| 1891 | 21,590,940 | 302,000 | 2,779,310 | 1,149,270 | 72,770,304 |
| 1892 | 32,080,080 | 107,000 | 2,690,530 | 1,396,790 | 78,510,385 |
| 1893 | 33,303,405 | 328,000 | 3,375,600 | 1,455,975 | 91,355,154 |
| 1894 | 22,546,945 | 334,000 | 4,090,220 | 1,516,400 | 64,351,815 |
| 1895 | 8,779,290 | 4,000 | 1,103,840 | 1,256,450 | 59,227,718 |
| 1896 | 24,763,445 | 411,000 | 1,538,360 | 2,072,600 | 92,722,348 |
| 1897 | 31,077,440 | 2,069,000 | 4,008,630 | 3,625,186 | 116,747,389 |
| 1898 | 26,733,965 | 3,345,000 | 4,586,140 | 9,639,324 | 127,426,374 |
| 1899 | 22,344,475 | 7,090,000 | 7,277,380 | 7,233,290 | 123,776,350 |
| 1900 | 25,613,410 | 4,186,000 | 6,502,410 | 5,779,350 | 124,983,458 |
| 1901 | 20,884,060 | 4,944,000 | 7,868,150 | 3,425,300 | 84,136,637 |
| 1902 | 16,024,715 | 46,000 | 3,225,360 | 2,701,220 | 50,622,907 |
| 1903 | 20,990,245 | 1,000 | 3,813,450 | 2,306,500 | 96,545,534 |
| 1904 | 17,321,325 | 11,804 | 4,260,550 | 2,964,950 | 100,542,207 |
| 1905 | 17,642,005 | 242,963 | 3,967,790 | 3,101,200 | 110,323,444 |
| 1906 | 30,325,825 | 162,462 | 3,930,640 | 5,915,260 | 98,396,563 |
| 1907 | 34,704,720 | 149,365 | 6,151,560 | 6,635,455 | 125,159,962 |

ANNUAL RECEIPTS OF OATS AT THE GREAT PRIMARY GRAIN MARKETS OF THE WEST.

| Year | St. Louis Bushels | Duluth Bushels | Minneapolis Bushels | Milwaukee Bushels | Chicago Bushels |
|---|---|---|---|---|---|
| 1887 | 9,768,545 | 78,000 | 2,086,200 | 2,568,936 | 45,750,842 |
| 1888 | 10,456,760 | 45,000 | 1,786,300 | 2,975,000 | 52,184,878 |
| 1889 | 11,347,340 | 322,000 | 1,971,000 | 2,664,000 | 49,901,942 |
| 1890 | 12,229,955 | 1,289,000 | 3,562,600 | 3,901,355 | 75,150,249 |
| 1891 | 12,432,215 | 370,000 | 4,308,020 | 4,799,694 | 74,402,413 |
| 1892 | 10,604,810 | 38,000 | 5,116,020 | 6,716,396 | 79,827,965 |
| 1893 | 10,056,225 | 24,000 | 3,553,110 | 8,097,474 | 84,289,886 |
| 1894 | 10,196,605 | 935,000 | 4,123,830 | 7,921,750 | 63,144,885 |
| 1895 | 10,466,160 | 1,218,000 | 5,481,220 | 8,840,075 | 79,890,792 |
| 1896 | 11,491,310 | 4,832,000 | 10,602,660 | 13,878,000 | 109,725,660 |
| 1897 | 12,147,225 | 6,870,000 | 16,263,640 | 10,523,600 | 118,086,662 |
| 1898 | 10,725,330 | 3,963,000 | 10,478,570 | 13,693,557 | 110,293,647 |
| 1899 | 12,606,535 | 3,059,000 | 11,013,930 | 13,741,100 | 110,775,732 |
| 1900 | 13,257,925 | 1,402,000 | 10,837,160 | 8,506,100 | 105,226,761 |
| 1901 | 15,728,150 | 1,316,000 | 10,718,880 | 8,763,800 | 90,632,152 |
| 1902 | 20,570,245 | 1,266,000 | 12,066,490 | 6,774,300 | 78,879,800 |
| 1903 | 20,409,930 | 4,807,000 | 22,394,040 | 8,397,550 | 88,668,396 |
| 1904 | 16,794,295 | 9,966,914 | 25,848,360 | 7,462,400 | 73,022,119 |
| 1905 | 18,963,365 | 9,470,088 | 25,125,740 | 8,820,500 | 92,486,761 |
| 1906 | 28,222,420 | 7,963,389 | 23,293,770 | 10,410,350 | 89,912,951 |
| 1907 | 29,896,600 | 3,633,677 | 19,765,010 | 12,505,750 | 93,906,776 |

ANNUAL RECEIPTS OF GRAIN AND FLOUR AT THE GREAT PRIMARY MARKETS OF THE WEST.

(Flour Counted as Wheat on basis of 4½ bushels to bbl.)

| Year | St. Louis Bushels | Duluth Bushels | Minneapolis Bushels | Milwaukee Bushels | Chicago Bushels |
|---|---|---|---|---|---|
| 1887 | 48,748,552 | 23,649,694 | 48,618,563 | 31,960,319 | 163,437,724 |
| 1888 | 51,195,121 | 16,188,620 | 48,042,504 | 30,486,254 | 152,588,188 |
| 1889 | 68,406,597 | 28,131,337 | 46,501,030 | 29,418,821 | 183,563,209 |
| 1890 | 77,795,231 | 28,755,246 | 53,186,379 | 35,735,937 | 219,052,513 |
| 1891 | 68,835,754 | 52,557,042 | 66,520,271 | 40,235,948 | 231,821,429 |
| 1892 | 80,548,136 | 65,408,711 | 83,777,629 | 48,768,938 | 255,832,556 |
| 1893 | 66,243,787 | 56,879,498 | 68,262,813 | 44,013,641 | 246,942,966 |
| 1894 | 51,646,405 | 58,657,468 | 64,779,828 | 41,171,234 | 187,553,469 |
| 1895 | 37,410,380 | 72,429,697 | 73,876,273 | 43,490,414 | 189,432,819 |
| 1896 | 57,208,249 | 87,647,498 | 85,184,008 | 53,332,917 | 253,802,133 |
| 1897 | 63,581,364 | 87,202,480 | 97,468,519 | 46,365,923 | 296,767,116 |
| 1898 | 60,384,611 | 96,075,067 | 95,860,853 | 63,264,312 | 320,436,356 |
| 1899 | 55,058,155 | 90,206,685 | 110,349,839 | 62,854,220 | 320,670,440 |
| 1900 | 69,555,649 | 61,057,930 | 106,717,549 | 56,107,682 | 349,637,295 |
| 1901 | 69,817,264 | 78,751,850 | 116,710,305 | 52,187,050 | 291,252,936 |
| 1902 | 80,416,654 | 78,228,943 | 113,997,745 | 51,179,870 | 218,815,805 |
| 1903 | 79,426,111 | 62,618,850 | 126,633,239 | 53,245,927 | 275,468,194 |
| 1904 | 71,850,183 | 59,190,239 | 132,140,269 | 47,765,282 | 265,496,447 |
| 1905 | 72,165,708 | 70,812,701 | 139,795,946 | 49,073,935 | 296,428,101 |
| 1906 | 90,108,061 | 81,329,611 | 121,302,253 | 56,774,956 | 280,832,206 |
| 1907 | 98,304,982 | 84,550,412 | 134,991,765 | 58,928,462 | 307,246,141 |

Although the foregoing tables speak for themselves, a word of comment will be offered. It is to be noted that Milwaukee, which has a good harbor, has not robbed Chicago of its grain business. To be sure, the barley trade of our neighbor has increased much faster than our own, but it would be an error to attribute the increase to its superior harbor facilities.

The fact that Chicago possesses two harbors has not received the attention it merits. One harbor has not been improved to keep pace with the increasing size of lake vessels and the other has been. This fact is, therefore, of great significance both as to the past and as to the future of lake traffic at Chicago.

The fact that South Chicago, although it has long possessed a good harbor, has not increased its grain, flour, coal, salt, cement, lumber and miscellaneous business throws a strong light on our harbor problem. It discredits those that hold that Duluth has come into a grain business and Milwaukee a large coal trade because the Chicago river was too small for modern vessels; it also should have a sobering influence on those sanguine persons who feel that deep water in the Chicago river and on the lake front will bring the fleets of the world into our harbors.

The large increase of business at South Chicago has been due to the iron ore receipts, a traffic we cannot get and do not wish, either

in the Chicago river or for a lake front harbor. The growing importance of the iron ore business and the stationary condition of other traffic at South Chicago are clearly shown by the following table, compiled from the annual reports of the Chief of Engineers, U. S. A., giving the entire freight tonnage, the iron ore receipts, and the aggregate of all other tonnage coming and going.

FREIGHT TONNAGE OF SOUTH CHICAGO.

| Year | Entire Freight Tonnage | Tonnage of Iron Ore | Tonnage of all Freight Save Iron Ore |
|---|---|---|---|
| 1896 ..... | 2,973,724 | 1,210,158 (1) | 1,743,566 |
| 1897 ..... | 3,493,218 | 1,734,086 | 1,759,132 |
| 1898 ..... | 4,117,526 | 2,212,032 (1) | 1,905,494 |
| 1899 ..... | 3,229,874 | 2,203,267 | 1,470,742 |
| 1900 ..... | 3,783,674 | 2,333,381 | 1,450,293 |
| 1901 ..... | 3,995,277 | 2,659,085 | 1,336,192 |
| 1902 ..... | 4,454,428 | 3,334,841 | 1,119,587 |
| 1903 ..... | 4,742,225 | 3,129,100 | 1,633,125 |
| 1904 ..... | 3,728,260 | 2,258,440 | 1,169,820 |
| 1905 ..... | 4,530,394 | 3,213 626 | 1,316,768 |
| 1906 ..... | 5,290,826 | 4,084,936 | 1,205,390 |
| 1907 ..... | 6,430,347 | 4,717,426 | 1,712,921 |

(1) Obtained from reports of Chicago Board of Trade, no statstics being published by the Chief of Engineers.

A greatly exaggerated notion also prevails of the volume of export grain moving through the Gulf ports. To be sure, there has been some growth in the movement through these gateways, but this is largely accounted for by the large areas thrown open to cultivation in what is now the state of Oklahoma. The statistics of late years are reassuring, as they show a recession rather than a progression of the movement through the Gulf ports.

EXPORTS OF WHEAT AND CORN FROM GALVESTON AND NEW ORLEANS.

| Year | Corn (Bushels) | | Wheat (Bushels) | |
|---|---|---|---|---|
| | New Orleans | Galveston | New Orleans | Galveston |
| 1890 | 12,028,000 | 36,000 | 1,523,000 | ..... |
| 1891 | 1,912,000 | 13,000 | 10,336,000 | 537,000 |
| 1892 | 7,379,000 | 145,000 | 14,207,000 | 378,000 |
| 1893 | 6,506,000 | 98,000 | 12,897,000 | 1,311,000 |
| 1894 | 5,441,000 | 5,000 | 2,926,000 | 135,000 |
| 1895 | 8,757,000 | 1,233,000 | 836,000 | ..... |
| 1896 | 25,298,000 | 6,222,000 | 3,853,000 | 3,439,000 |
| 1897 | 27,218,000 | 4,336,000 | 9,730,000 | 6,788,000 |
| 1898 | 21,341,000 | 5,489,000 | 13,129,000 | 10,396,000 |
| 1899 | 20,266,000 | 6,637,000 | 12,164,000 | 15,117,000 |
| 1900 | 22,966,000 | 3,302,000 | 7,862,000 | 10,740,000 |
| 1901 | 12,327,000 | 128,000 | 21,392,000 | 15,870,000 |
| 1902 | 1,571,000 | 757,000 | 14,158,000 | 10,231,000 |
| 1903 | 13,328,000 | 4,336,000 | 13,566,000 | 18,710,000 |
| 1904 | 5,111,000 | 3,408,000 | 2,603,000 | 3,456,000 |
| 1905 | 20,410,000 | 10,278,000 | 537,000 | 2,614,000 |
| 1906 | 13,398,000 | 10,332,000 | 5,731,000 | 11,553,000 |
| 1907 | 7,550,000 | 6,609,000 | 5,336,000 | 9,561,000 |

The above statistics were obtained from Tunell's Report on Lake Commerce to the Treasury Department, page 59, and the Reports of the Chicago Board of Trade, 1898, page 167, and 1907, pages 156-7.

Some statistics will now be introduced showing the receipts and shipments of cattle at the leading western markets competing with Chicago. They are presented to give you an idea of where the grain of the West is going. Also, to show that the other cities of the West have become more successful rivals for traffic never affected by the state of our harbor than for the grain business, whose prosperity is supposed to be bound up with lake transportation. As the surplus-producing areas were pushed farther and farther west and northwest and southwest, large market towns grew up on the new traffic developed and their gain was not our loss. Kansas City has grown because she has shared largely in the trade of newly settled Oklahoma and not because of traffic she has taken from us.

RECEIPTS OF CATTLE.

| Year | St. Louis | Kansas City | St. Joseph | Omaha | Sioux City | Total of the five Cities | Chicago |
|---|---|---|---|---|---|---|---|
| 1887 | 464,[illegible] | [illegible],224 | | 229,377 | | 1,373,439 | 2,262,006 |
| 1888 | 546,975 | 1,056,066 | 29,061 | 355,923 | 54,788 | 2,013,252 | 2,611,543 |
| 1889 | 506,190 | 1,220,243 | 30,061 | 473,094 | 104,915 | 2,067,270 | 2,628,281 |
| 1890 | 620,014 | 1,472,229 | 27,521 | 615,227 | 167,010 | 2,884,422 | 2,494,220 |
| 1891 | 779,409 | 1,270,917 | 18,416 | 601,002 | 150,913 | 2,762,306 | 2,250,259 |
| 1892 | 801,111 | 1,479,078 | 21,015 | 755,059 | 126,022 | 3,172,912 | 2,571,796 |
| 1893 | 908,207 | 1,630,207 | 39,944 | 833,456 | 120,794 | 3,554,612 | 2,123,406 |
| 1894 | 773,071 | 1,669,198 | 52,157 | 821,512 | 119,006 | 3,432,450 | 2,974,363 |
| 1895 | 851,276 | 1,613,454 | 49,202 | 566,103 | 110,278 | 3,188,471 | 2,698,558 |
| 1896 | 905,613 | 1,714,033 | 28,593 | 596,578 | 142,228 | 3,406,754 | 2,600,476 |
| 1897 | 960,762 | 1,817,526 | 49,143 | 810,949 | 294,161 | 3,751,047 | 2,554,924 |
| 1898 | 795,611 | 1,757,964 | 225,994 | 812,244 | 300,987 | 3,709,546 | 2,480,397 |
| 1899 | 766,983 | 1,912,019 | 296,237 | 837,563 | 345,109 | 3,960,574 | 2,514,446 |
| 1900 | 795,300 | 1,969,718 | 379,967 | 838,204 | 300,457 | 4,114,785 | 2,729,046 |
| 1901 | 939,351 | 2,000,165 | 425,022 | 815,008 | 307,539 | 4,771,963 | 3,031,396 |
| 1902 | 1,161,628 | 2,082,541 | 494,016 | 1,010,815 | 299,128 | 5,000,309 | 2,941,539 |
| 1903 | 1,209,121 | 1,953,371 | 579,963 | 1,071,177 | 372,506 | 5,085,457 | 3,422,486 |
| 1904 | 1,261,532 | 1,906,610 | 550,549 | 944,192 | 326,057 | 5,028,465 | 3,209,185 |
| 1905 | 1,254,226 | 2,180,491 | 501,200 | 1,026,362 | 304,267 | 5,361,764 | 3,410,469 |
| 1906 | 1,314,896 | 2,295,979 | 553,525 | 1,079,373 | 373,895 | 5,705,300 | 3,239,269 |
| 1907 | 1,322,208 | 2,394,294 | 557,845 | 1,158,716 | 402,570 | 6,287,485 | 3,305,214 |

Monthly Summary of Internal Commerce of the United States December, 1907, pages 600-602.

## Coal Traffic

Proposition Number 3.—The consumption of anthracite coal in the West has increased but little. As the supply is limited and held in strong hands, it will be mined slowly and a largely increased movement to this city and the West, either by lake or rail, should not be looked for. The following table shows that Milwaukee's receipts, like our own, are about stationary, notwithstanding the fact that she has a good harbor. The statistics were obtained from the annual reports of the Chicago Board of Trade and the Milwaukee Chamber of Commerce. Previous to 1901 Chicago's receipts by lake of anthracite and bituminous coal were not reported separately.

Proposition Number 4.—There will be no large increase in Chicago's receipts of bituminous coal by lake from Ohio, Pennsylvania and West Virginia, because Illinois and Indiana possess large deposits of good coal, easily mined, and just as near Chicago as the Eastern coal fields are to Lake Erie ports.

In recent years Chicago's supplies have been drawn from nearby fields in much larger measure than formerly. She now looks to the Illinois and Indiana mines for her requirements and naturally the coal arrives by rail.

RECEIPTS OF ANTHRACITE COAL BY LAKE AT CHICAGO AND MILWAUKEE.

| Year | Chicago Tons | Milwaukee Tons |
|---|---|---|
| 1895 | ..... | 853,680 |
| 1896 | ..... | 813,487 |
| 1897 | ..... | 645,432 |
| 1898 | ..... | 768,150 |
| 1899 | ..... | 922,321 |
| 1900 | ..... | 639,100 |
| 1901 | 1,036,586 | 845,687 |
| 1902 | 225,102 | 172,676 |
| 1903 | 1,176,306 | 946,596 |
| 1904 | 960,630 | 876,169 |
| 1905 | 958,025 | 802,083 |
| 1906 | 781,751 | 756,646 |
| 1907 | 1,093,958 | 858,402 |

Although receipts by lake at this port have remained about stationary, it must not be inferred that Chicago's coal trade has been at a standstill, for in reality the growth of our business has been very rapid. The subjoined table shows Chicago's receipts by lake, her total receipts, and Milwaukee's total receipts, practically all of which arrive by lake.

With the changes in the sources of supply from Ohio, Pennsylvania and West Virginia to Indiana and Illinois, more coal than formerly is likely to go direct from the mines to the local dealers of northern Illinois, southwestern Wisconsin, Iowa and southern Minnesota, especially if nothing is done to expedite movement through this city by rail.

The chief reason why Illinois and Indiana coal is displacing Eastern coal in this market is not far to seek. It is found in the low freight rates in force from nearby fields. It costs less to ship coal from Illinois and Indiana mines to Chicago than it costs to send

RECEIPTS OF COAL AT CHICAGO AND MILWAUKEE.

| Year | Receipts at Chicago | | Total Receipts at Milwaukee |
|---|---|---|---|
| | By Lake | Total | |
| 1890 ..... | 1,276,787 | 4,727,384 | 996,658 |
| 1891 ..... | 1,310,347 | 5,201,633 | 1,156,033 |
| 1892 ..... | 1,475,227 | 5,529,468 | 1,374,414 |
| 1893 ..... | 1,424,853 | 6,368,375 | 1,249,732 |
| 1894 ..... | 1,277,191 | 5,336,124 | 1,337,046 |
| 1895 ..... | 1,269,512 | 6,091,284 | 1,446,422 |
| 1896 ..... | 1,319,693 | 6,322,773 | 1,587,795 |
| 1897 ..... | 1,233,771 | 6,810,222 | 1,555,808 |
| 1898 ..... | 1,527,511 | 7,387,200 | 1,689,061 |
| 1899 ..... | 1,302,740 | 8,668,056 | 1,919,864 |
| 1900 ..... | 991,297 | 8,839,657 | 1,803,593 |
| 1901 ..... | 1,087,826 | 9,429,952 | 1,953,489 |
| 1902 ..... | 288,208 | 9,834,957 | 1,641,095 |
| 1903 ..... | 1,261,470 | 11,259,022 | 3,021,643 |
| 1904 ..... | 1,025,318 | 10,758,264 | 2,944,439 |
| 1905 ..... | 1,037,097 | 10,817,681 | 3,157,464 |
| 1906 ..... | 875,480 | 12,246,559 | 3,815,275 |
| 1907 ..... | 1,508,492 | ..... | 4,349,507 |

coal from the mines of Ohio, Pennsylvania and West Virginia to Lake Erie ports. From Lake Erie ports the lake rate, varying from 40 to 70 cents, must be added.

## Rates on Coal Per Ton F. O. B. Vessel from Ohio, Pennsylvania and West Virginia Mines to Cleveland

From Ohio Mines—

| | NET TON |
|---|---|
| Massillon District | $0.75 |
| Middle District (around Carrollton) | .75 |
| District No. 8 (near Wheeling) | .90 |

From Pennsylvania Mines—

| | |
|---|---|
| Finleyville District | .93 |
| Connellsville and Fairchance Districts | 1.01¼ |
| Klondike Region | 1.01¼ |

From West Virginia Mines—

| | |
|---|---|
| Moundsville District | .93 |
| Clarksburg, Belington, Fairmount, Junior, Monangah, Opekiska, Short Line and Ohio River districts | 1.01¼ |

The rates f. o. b. vessel include a loading charge of 5c per ton.

## Rail Rates on Coal from Illinois and Indiana Mines to Chicago for Local Use

| | Net ton. |
|---|---|
| La Salle, Streator, Braidwood, Cardiff, etc | $0.50 |
| Danville Field | .67 |
| Brazil, Clinton, Terre Haute, etc., Indiana | .70 |
| Springfield, Litchfield, Pana, etc | .75 |
| Linton, Sullivan, etc., Indiana | .80 |
| Du Quoin | .90 |
| Belleville, Zeigler, Carbondale, etc | 1.00 |

It should not, however, be inferred that the competitive struggle of the lake and rail carriers is wholly a matter of rates. Other advantages are offered by the rail carriers. They penetrate every part of Chicago with their spurs, sidings and industry tracks, and place coal very near if not immediately beside the furnace where it is to be burned. Delivery by vessel generally involves an extra handling at the docks and a long haul by team, which frequently costs as much as the entire transportation from the mine.

To most consumers the carload is also a more convenient and acceptable unit than the cargo. The breakage, especially of bituminous coal, accompanying the dumping of the carload into the hold of the vessel, is large. With our fifty-ton cars this cannot easily be prevented. Hard coal loses its luster when moved by boat and does not bring the same price as the all-rail coal. The railroad delivers its supplies day by day the year around as needed; the lake vessel delivers a large unit at considerable intervals and is not in business six of the twelve months of the year. Provision on a large scale must thus be made for storage.

The facilities for handling coal on the Chicago river have become antiquated. However, if the river were sufficiently enlarged to admit modern vessels, the old docks would quickly be replaced by up-to-date facilities and our coal business would be conserved.

## Iron Ore

Proposition Number 5.—Iron ore goes to South Chicago and in the future will also go largely to Gary. The growing traffic in this commodity is neither expected nor desired on the Chicago river. We are very favorably located for the manufacture of iron and steel. The raw materials can be cheaply assembled and a large market for the finished products is at hand. Ore boats from Lake Superior have but one restricted channel to navigate, and those from Escanaba have none. Generally speaking, the St. Mary's river and the "Soo" locks afford at least one foot more of water than the Lime Kiln crossing, below Detroit. The new works at Gary will greatly lessen our dependence on the East for iron and steel and their finished products.

## Building Materials

Proposition Number 6.—Building materials constitute a large part of the traffic on some European waterways, but they have never been received here by lake in large quantities and probably never will be. The home supply of sand is unlimited and excellent clay for

PRODUCTION OF PORTLAND CEMENT.

| State | 1900 Barrels | 1906 Barrels |
|---|---|---|
| Michigan | 664,750 | 3,747,525 |
| Indiana | 30,000 | 3,951,836 |
| Illinois | 240,442 | 1,858,403 |
| Missouri | 825,257 (1) | 3,350,000 |
| Kansas | 80,000 | 3,020,862 |
| Colorado | 35,708 | 1,146,396 |
| Total | 1,876,157 | 17,075,022 |

(1) Output of 1908.

making brick, tile and terra cotta is near at hand. Stone as good as can be found on either shore of Lake Michigan can be had at many

places within the city's limits and along the drainage canal. Building materials, the same as coal, must be delivered near the place where they are to be used, and the railroads, as they ramify all parts of the city, offer a better service than the lake boats.

Proposition Number 7.—Owing to the wonderful strides of the Western States in the production of cement, the movement of this commodity by lake into Chicago is much more likely to decrease than increase. Indiana's production is largely accounted for by the output of the Illinois Steel Company's plant, which is just over the state line. Chicago thus has a very large factory at its very doors. The statistics given in the table on the preceding page were taken from Mineral Resources, 1900, 1903, 1906, a publication of the United States Geological Survey.

## Sugar Traffic

Proposition Number 8.—Receipts of sugar by water, as a result of the increasing production of beet sugar in the West, are more likely to fall off than grow in volume. The irrigated lands of the arid valleys are admirably adapted to the successful cultivation of the sugar beet. The amount of sugar secreted depends very largely on weather conditions at the end of the season. In a wet and cold autumn the plants do not mature; but with dry weather and sunshine the beets ripen and yield a bountiful crop of sugar. The power to regulate the supply of moisture and ripen the crop thus rises to paramount importance. As the rainfall is very slight in the irrigated districts, the farmer is practically master of the situation and a crop of beets rich in sugar content is the rule rather than the exception. The control of the water supply makes certain what would otherwise be in doubt. It assures the harvest.

During the census year 1900 the output of beet sugar in all the states west of the Missouri river but slightly exceeded 100,000,000 pounds. The experimental stage, however, had now been passed and production increased rapidly. During the season of 1906-7 the output exceeded 700,000,000 pounds, being about seven times what it was but seven years before.

As the average consumption of sugar per capita in the United States during the year 1906-7 was 77.5 pounds, the western output nearly satisfied the needs of 10,000,000 people—that is, more people than there were in North and South Dakota, Nebraska, Kansas, Oklahoma, New Mexico, Colorado, Wyoming, Montana, Idaho, Utah, Arizona, Nevada, California, Oregon and Washington.

With the record of recent years at hand it seems entirely safe to predict that the beet sugar growers of the West will, year by year, push their products farther and farther eastward. And it seems reasonable to suppose that within a few years they will drive Eastern sugar from all the territory west of the Mississippi river. If the output of beet sugar in the territory west of a line drawn north and south through Chicago doubles during the next decade, home supply will equal home demand and there will be no sugar brought from the East to Chicago either by lake or rail. But even if this forecast is not fully realized, the signs point strongly toward the zone of beet sugar supply being greatly extended and the zone of Eastern supply correspondingly restricted.

## Traffic and Rates Here and Abroad by Rail and by Water

The commodities making up the great bulk of the tonnage of this port and of the lakes have now been reviewed. The results need not again be summarized.

It is my judgment that no form of transportation, either water or rail, and no port or city that does not handle the crude products of

UPSTREAM FREIGHT TRAFFIC ON THE RHINE PASSING OVER THE DUTCH-GERMAN FRONTIER IN 1905.

| Commodity | Tons | Per Cent |
|---|---|---|
| Ore | 5,351,627 | 42.7 |
| Coal | 673,836 | 5.4 |
| Petroleum | 284,418 | 2.3 |
| Cement, trass and lime | 85,690 | 0.7 |
| Wheat | 1,687,193 | 13.5 |
| Oats | 556,773 | 4.4 |
| Barley | 323,817 | 2.6 |
| Rye | 312,990 | 2.5 |
| Flaxseed | 232,182 | 1.9 |
| Rice | 29,122 | 0.2 |
| Corn and other grain | 369,703 | 2.9 |
| Flour and cereal products | 96,480 | 0.8 |
| Forest products | 799,219 | 6.4 |
| Fertilizers | 429,946 | 3.4 |
| Sugar, molasses and sirup | 155,353 | 1.2 |
| Pig and scrap iron | 104,318 | 0.8 |
| Other non precious metals | 110,769 | 0.9 |
| Coffee, chicory and cocoa | 75,168 | 0.6 |
| Tallow and grease | 145,256 | 1.2 |
| Tar, pitch, rosin and asphalt | 91,832 | 0.7 |
| Fresh and dried fruits | 27,113 | 0.2 |
| Fish and herring | 22,680 | 0.2 |
| Miscellaneous articles | 567,106 | 4.4 |
| Total Upstream Tonnage | 12,532,600 | 100.00 |

the field, forest and mine should expect a large freight tonnage. Some people believe that the European waterways have succeeded

in building up a large traffic in miscellaneous articles, but the facts do not bear out the supposition.

The Rhine has the largest freight traffic of the waterways of Europe. And the latest statement available will be submitted showing the total tonnage and that of the principal commodities passing up and down the river over the customs frontier between Holland and Germany. At this point the Rhine traffic probably rises to its greatest volume. The statistics were obtained from pages 85 and 89 of the 1907 number of the Statistical Yearbook of the German Empire, published by the Imperial Statistical Office.

The products of mines, including petroleum, formed 51.1 per cent of the upstream traffic; grain and its products contributed 28.8 per cent, and forest products accounted for 6.4 per cent. The aggregate contribution of the crude products of mines, fields and forests was 86.3 per cent of the total.

DOWNSTREAM FREIGHT TRAFFIC ON THE RHINE PASSING THE GERMAN-DUTCH FRONTIER IN 1905.

| Commodities | Tons | Per Cent |
|---|---|---|
| Coal and coke | 4,447,991 | 54.7 |
| Manufactured iron | 1,084,182 | 13.3 |
| Pig and scrap iron | 86,682 | 1.1 |
| Other non precious metals | 49,984 | 0.6 |
| Stone | 499,141 | 6.1 |
| Building stone | 32,356 | 0.4 |
| Stoneware, porcelain, etc. | 159,095 | 2.0 |
| Salt | 61,735 | 0.8 |
| Fertilizers | 52,169 | 0.6 |
| Forest products | 34,277 | 0.4 |
| Wine | 27,765 | 0.3 |
| Glass and glassware | 26,949 | 0.3 |
| Saltpetre, sulphuric acid, etc. | 13,055 | 0.2 |
| Miscellaneous | 1,543,019 | 19.0 |
| Total Downstream Tonnage | 8,118,400 | 100.00 |

Of the total downstream tonnage passing over the German-Dutch frontier, coal, coke, iron, stone and forest products constituted 76 per cent.

The widespread optimism just now prevailing regarding the future of water transportation in this country I do not share and,

unlike many other investigators, I find no encouragement in European experience.

From year to year Europe is becoming more and more dependent on distant lands for its food supplies and raw materials and is producing increasing quantities of manufactured goods for export. This is oversea traffic and must come and go by water and naturally the business of the seaports has grown. The districts flanking the Rhine have become a vast workshop and draw great quantities of foodstuffs, ore, lumber, petroleum, etc., up the river and send manufactured iron and coal down the river.

To ascribe the great growth of traffic to and from the Rhine districts of Germany, which for the most part merely touches Antwerp and Rotterdam, to the harbor improvements at these cities, still mostly on paper, would be an obvious error. It would be very much like attributing the wonderful increase of traffic on the Detroit river to the harbor improvements at Detroit.

In the oversea trade, communication must be by water, but not so from Chicago. Here the water carriers, heavily handicapped in the matter of distance, have to meet on every hand the competition of the railroads with their better terminal facilities. From Chicago to New York City by rail is 905 miles; by lake and rail 1,299 miles; and by lake and canal 1,384 miles.

As the Manchester Canal and the Rhine river may be cited as exceptions to my contention that no European situation analogous to our own problem can be introduced, a word will be offered about these waterways. Of course, the situation at Manchester was unlike our own. If Chicago were as near salt water as Manchester and rail rates and cost of trans-shipment were as high as abroad, I should certainly favor the construction of a canal. And for the same reason that I should favor the extension of a railroad 35.5 miles, even if it involved extremely difficult and expensive construction, if thereby a great traffic center could be reached and trans-shipment to a boat would be obviated, with all the expense, loss, delay and breakage incident to transfer. Such action would be justified because all traffic would continue on to its destination by rail if the rail charges from the point of water competition did not exceed the combined cost of trans-shipment and movement by water.

The enormous costs of trans-shipment at Liverpool and the short rail haul to Manchester are shown by William E. Curtis in his letter from Manchester, published in the Record-Herald of October 20, 1908. Mr. Curtis wrote:

"Before the canal was built all the cotton consumed in the Manchester district, which is the largest manufacturing district in the world, had to be unloaded from the ocean steamers at Liverpool, hauled through that city on carts to a railway station, carried to Manchester by rail, unloaded from the cars into warehouses and then hauled to the factories by wagons at a total expense of 14 shillings 8 pence per ton—about $3.66 in our money. Of this the dock charge was 3 shillings, the cost of handling 1 shilling 3 pence, cartage to railway 1 shilling 3 pence, freight to Manchester 7 shillings 2 pence, cartage to factory 2 shillings—which equals 14 shillings 8 pence."

In this high tribute of $3.66 per ton we find the justification for the construction of the Manchester Canal. The distance from Liverpool to Manchester is 35.5 miles; the average cost of movement from the ship's side was therefore a trifle more than ten cents per ton per mile. If the Liverpool transfer facilities were up to date and the rail rates as low as they are in this country, it is extremely doubtful if the Manchester Canal could have been made to pay.

The construction of the Manchester Canal did not grow out of a conviction that water transportation would be enough cheaper than rail transportation as to warrant the large expenditure of money involved. Less than one-half of the expense of movement of cotton from the ship's side in Liverpool to Manchester represented payments to railroads. Manchester strove to avoid the delay and expense of breaking bulk en route.

Many people believe that up-to-date waterways can hold their own with all comers not only in the struggle for crude products of low value, but in the race for manufactured goods as well. In support of these views the Rhine is cited with confidence.

If it can be said that the railroads of this country have been developed and the waterways have not been, the reverse can be said with equal truth of Europe so far as freight transportation is concerned. Europe is still living in the era of the ten-ton freight car, while we have moved on to the 55-ton car.

The railroads of this country give the water carriers much more severe competition than the railroads of Europe. This is why our rivers are losing their traffic, even the Mississippi, where, on its lower reaches, there is a greater depth of water than in the Rhine. The average freight rate per ton mile on the United Prussian and Hessian State railroads during 1906 was 13.41 mills, while the average rate in the United States was but 7.48 mills. As the attempt is sometimes made to discredit this showing by the retort that the traffic of American railways is largely made up of crude commodi-

ties, while that of German railways is largely composed of manufactured articles, I will add that coal and coke contributed 41.83 per cent of the total traffic of the United Prussian and Hessian State railways in 1906, and but 36.45 per cent of the total traffic of the railroads of the United States.

The percentages just given were obtained from the Bericht ueber die Ergebnisse des Betriebes der Vereignigten Preussischen and Hessischen Staatseisenbahnen in Rechnungsjahre, 1906, page 199, and from Statistics of the Railways of the United States, 1906, page 78, published by the Interstate Commerce Commission.

Unlike the railroads of Europe, those of this country compete vigorously with the water carriers for even the lowest kinds of traffic. The average rate on coal and coke on the United Prussian and Hessian State Railways in 1906 was 9.79 mills; on the Chesapeake and Ohio Railway it was but 3.27 mills. The Illinois Central Railway carries coal in large quantities from the southern part of this state to Chicago for 3.13 mills, seven per cent of which go to the state. The average rate on coal for the whole United States would be submitted, but it is not available. The Interstate Commerce Commission contents itself with the compilation of the grand average rate on all commodities.

It is usually supposed that the waterways abroad are much more efficient than those at home and that their rates are correspondingly lower. As a matter of fact, the rates abroad, even on the Rhine, are exceedingly high in comparison with those prevailing on the Great Lakes, and the railroads of this country would quickly drive the Rhine boats out of business unless they can live on much lower rates than they now charge. Even the rates on the Erie Canal compare favorably with those on the Rhine. The uphill struggle the Rhine boats would have if pitted against modern freight-carrying railroads is indicated by the following table:

AVERAGE RATES ON WHEAT PER BUSHEL AND PER TON IN 1903.

| Route | Distance Miles | Rate Per Bushel | Rate Per Ton |
|---|---|---|---|
| Buffalo to New York City by Canal | 500 | $ .0400 | $1.33 |
| Buffalo to New York City by Rail | 410 | $ .0427 | 1.42 |
| Antwerp to Strasburg by the Rhine | 501 | $ .0475 | 1.58 |
| Antwerp to Strasburg by the French Canals | 504 | $ .0693 | 2.31 |
| Antwerp to Strasburg by Rail | 372 | | |

The rate from Buffalo to New York City by canal was obtained from the Statistical Abstract of the United States, 1907, page 234, and the rate by rail from the traffic department of the New York Central & Hudson River R. R.; for the rates abroad see Monthly Summary of Commerce and Finance, January, 1905, published by the Department of Commerce and Labor. Statistics for a later year would be submitted, but none for European waterways are available. It should be noted that, although the distance by rail from Buffalo to New York City is 38 miles greater than the distance by rail from Antwerp to Strasburg, the freight charge is less than by the Rhine boats.

AVERAGE RATES ON COAL PER NET TON.

| Route | Distance Miles | Rate |
|---|---|---|
| Antwerp to Charleroi via Scheldt and Canal | 87.87 | $0.56 |
| Antwerp to Charleroi via Railroad | 61.85 | 0.81 |
| Streator to Chicago via Santa Fe | 94.00 | 0.50 |
| Charleroi to Ghent via Scheldt and Canals | 110.87 | 0.66 |
| Charleroi to Ghent via Railroad | 66.26 | 0.73 |
| Danville to Chicago via C. & E. I. R. R. | 123.40 | 0.67 |
| Antwerp to Paris via Scheldt and Canals | 287.50 | 1.70 |
| Antwerp to Paris via Railroad | 219.58 | 2.81 |
| DuQuoin to Chicago via Illinois Central R. R. | 287.04 | 0.90 |
| Antwerp to Cologne via the Rhine | 256.25 | 0.55 |
| Antwerp to Cologne via Railroad | 134.26 | 1.56 |
| Wenona to Chicago via Illinois Central R. R. | 138.04 | 0.55 |
| Antwerp to Mannheim via the Rhine | 418.75 | 1.10 |
| Antwerp to Mannheim via Railroad | 293.48 | 2.92 |
| ElDorado to Chicago via Big Four Railroad | 306.80 | 1.00 |
| Antwerp to Strasburg via the Rhine | 500.75 | 1.46 |
| Antwerp to Strasburg via Railroad | 371.54 | 2.68 |
| Belington, W. Va., to Cleveland via B. & O. Railroad | 304.30 | 0.97 |
| Pocahontas, W. Va., to Toledo via N. & W. and H. V. R. R.'s | 455.70 | 1.45 |

Rates abroad were obtained from the Monthly Summary of Commerce and Finance, January, 1905, published by the Department of Commerce and Labor. The domestic rates were obtained from the official tariffs now effective or by correspondence.

In the foregoing tables the distances were inserted so that it would be seen that the rates quoted are for hauls of substantially the same length. Where the waterway is unusually roundabout, as from Antwerp to Cologne, I have contrasted an American rail haul at least equal to the rail hauls abroad. If rail rates abroad were as low as here, the water rates would be met in every case.

By this table it becomes apparent that if the canals and rivers of Europe had to meet the competition of American railways they

would in most instances be obliged radically to reduce their rates or go out of business. With rates equal traffic almost invariably goes to the railway, because the service of the latter usually presents advantages sufficient to control the business, even though its rates are somewhat higher.

In comparing rail and water rates account is seldom taken of expenditures from the public treasury for the construction, maintenance and administration of waterways. On some of the lesser rivers and canals of Germany such expenditures exceed and on others form a substantial part of the whole freight charge imposed by many American railways.

Some statistics from Professor Walther Lotz's book on the Development of Transportation in Germany, which were reprinted on page 260 of the January (Waterway) number of the Annals of the American Academy of Political and Social Science, will be submitted showing the cost of maintenance and administration of some of the lesser waterways of Germany, the total number of tons of freight moved one mile and the amount of toll that would have to be collected to cover the government expenditures. No account is taken of the original expenditures for construction and none is taken of municipal expenditures, which greatly exceed those made by the local governments in this country.

COST OF MAINTENANCE AND ADMINISTRATION FOR ONE YEAR.

| River | Cost of Maintenance and Administration. | Tons Carried One Mile | Cost of Maintenance and Administration per Ton Mile. |
|---|---|---|---|
| Moselle ..... | $ 50,825 | 3,726,000 | 1.36 cents |
| Weser down to Bremen ..... | 127,537 | 67,689,000 | 0.19 cents |
| Warthe ..... | 128,725 | 54,648,000 | 0.24 cents |
| Weichsel and Nogat ..... | 472,862 | 108,675,000 | 0.44 cents |

A comparison of rates is incomplete without a comparison of the services rendered respectively by the waterways and railroads in return for the rates collected. That there is a substantial differ-

ence in the services rendered is made patent by the following table showing the class rates between New York City and Chicago.

With the differences in rates that obtain it need scarcely be said if the water carriers offered as good services as the rail carriers, they would monopolize the business.

FREIGHT RATES BETWEEN NEW YORK AND CHICAGO.

| | All Rail. | Standard Lake and Rail. | Canal and Lake. |
|---|---|---|---|
| First Class .... | 75 cents | 62 cents | 42 cents |
| Second Class ... | 65 cents | 54 cents | 36 cents |
| Third Class .... | 50 cents | 41 cents | 29 cents |
| Fourth Class.... | 35 cents | 30 cents | 23 cents |
| Fifth Class .... | 30 cents | 25 cents | 21 cents |
| Sixth Class .... | 25 cents | 21 cents | 18 cents |

The all-rail rates are higher than the lake-and-rail and the lake-and-canal only as 40-cent coffee may be higher than 30 or 20 cent coffee, or as rates and fares over a standard rail line may be higher than those over a differential rail line. And it is equally true historically speaking that rail rates have been as influential in bringing down water rates as the latter have been in reducing the former.

## Conclusions and Recommendations

Many years ago there was an actual congestion in the Chicago river, caused by the vast number of small boats passing in and out. But that day has gone, never to return. The small boats are rapidly going out of commission. A modern freighter of even medium size will carry the cargoes of twenty of the old-time boats.

If the present-day Chicago river traffic of 5,000,000 tons were evenly distributed through the 200 days of an ordinary navigation season, the daily combined in and out movement would be 25,000 tons. This volume of business could easily be handled by two modern boats of medium size coming in and two going out. If the traffic of the river should double in volume, it could be moved easily by four such boats coming in and four going out.

Lighterage from a lake front harbor to the Chicago river is not

favored, because it will be too expensive to be borne by bulky commodities of low value. The Chicago Lighterage Company and the Merchants' Lighterage Company charge three cents per 100 pounds for transferring freight. This rate amounts to 60 cents per ton and about equals the lake rate on grain from Chicago and Duluth and on iron ore from Lake Superior ports to Lake Erie ports. It exceeds the lake rate on coal from Lake Erie ports to the upper lake ports.

To be sure, this lighterage charge is now absorbed by the railroads, but it is nevertheless an added burden on the commerce of this port. Practically all of the railroads running into Chicago have a choice of ports. For example, the Santa Fe, which gridirons the great wheat-producing state of Kansas, can haul grain equally well to Galveston, the Hill roads and the Northwestern, which cover eastern Nebraska, have terminals in Duluth, and the Northwestern and St. Paul, which cross and re-cross the great grain-producing states, have terminals at all of the principal ports on the upper lakes.

These facts should make it apparent that an outer harbor with lighterage, by imposing additional burdens on the railroads, will divert traffic from rather than draw it to Chicago. The switching charge of four dollars a car from Chicago to the Calumet terminals is a much lighter burden on the railroads than the lighterage charges now in force.

Most of the commodities that come to us by lake are destined for home consumption and must therefore pass from the lake into the heart of the city. And the large unit afforded by the boat is the most economical way in which this result can be accomplished. It also offers less obstruction than any other plan excepting tunnels. A boat carrying 6,000 tons will pass a bridge in two or at the most three minutes. There is no other feasible plan of transfer offering fewer objections than the boat in which the cargo arrives.

We have seen that notwithstanding the fact that all-rail rates from New York to Chicago are about 20 per cent higher than the rail-and-lake rates and about 100 per cent higher than the canal-and-lake rates the railroads all but monopolize the traffic in the higher classes of goods. In my opinion this result is largely due to the fact that the railroads penetrate to every part of this city and can literally deliver goods in several thousand places.

If this analysis be correct, it follows as a matter of course that the Chicago river, with its branches running far to the north and to the south, forms a better terminal than a lake front harbor would.

The river serves the needs of local traffic better and the requirements of through traffic as well as an outer harbor would.

As the consumer is generally not known until after the cargo is unloaded, it would seem to be the part of wisdom to land coal, lumber and other commodities where they can be sold to the local trade or loaded into cars for shipment into the interior. At present our local trade is the more important and any plan of harbor improvement that does not heed this fact will prove abortive.

I am aware that it will be somewhat expensive to take large vessels in and out of the Chicago river, even after it is widened and straightened. This expense, however, will always be small compared with the cost of transfer by lighter or tunnel.

Manchester dug a canal at a cost of $75,000,000, largely for the purpose of freeing its commerce from the heavy burden of transshipment charges imposed at Liverpool. And it has developed that masters make the same rates to Manchester that they do to Liverpool, even though there are 35.5 miles of additional navigation in a restricted channel.

An exaggerated idea prevails of the importance of the big vessels, even in the Lake Superior trade. There are not many boats of the 605-foot class on the lakes, just as there are not many Lusitanias on the ocean. The bulk of the business is done by vessels of medium size and less than 500 feet in length. This fact is shown by the following table, taken from page 9 of the 1907 Statistical Report of Lake Commerce Passing Through the Sault Ste. Marie canals, prepared under the direction of Colonel Charles E. L. B. Davis, Corps of Engineers, U. S. A.

AVERAGE AND MAXIMUM DIMENSIONS OF, AND PERCENTAGE OF TOTAL FREIGHT CARRIED BY, VESSELS OF DIFFERENT CLASSES, USING THE "SOO" CANALS DURING 1907.

| Class Tons Net Register Between | Number of Boats of Class Using Canals | Average Length Feet | Maximum Length Feet | Maximum Beam Feet | Per cent of Total Freight Carried by Class |
|---|---|---|---|---|---|
| 1 and 1000 | 349 | 151 | 258 | 42 | 4.0 |
| 1000 and 2000 | 207 | 263 | 366 | 44 | 15.0 |
| 2000 and 3000 | 79 | 365 | 448 | 51 | 12.4 |
| 3000 and 4000 | 126 | 429 | 484 | 53 | 32.0 |
| 4000 and 5000 | 56 | 504 | 569 | 56 | 16.4 |
| 5000 and 6000 | 50 | 560 | 605 | 60 | 19.2 |
| 6000 and over | 2 | 605 | 605 | 60 | 1.0 |

The fear is often expressed that the time will soon come when there will be no boats on the lakes that can enter the Chicago river, even if it is straightened and the center pier bridges are removed. That this danger is not imminent is shown by the following table, which I have compiled to show the size of the freight boats that have been launched since 1902 and are under contract to be launched during 1909:

NUMBER AND SIZE OF FREIGHT VESSELS LAUNCHED, ON THE GREAT LAKES.*

| Calendar Year | LENGTH OVER ALL** | | | | |
|---|---|---|---|---|---|
| | 0 to 450' | 450'+ to 500' | 500'+ to 550' | 550'+ to 600' | 600'+ to 605'5" |
| | Number | Number | Number | Number | Number |
| 1902 | 40 | 0 | 0 | 0 | 0 |
| 1903 | 41 | 3 | 0 | 0 | 0 |
| 1904 | 7 | 2 | 0 | 1 | 0 |
| 1905 | 4 | 7 | 16 | 4 | 0 |
| 1906 | 9 | 5 | 16 | 10 | 3 |
| 1907 | 15 | 5 | 9 | 16 | 0 |
| 1908 | 9 | 7 | 7 | 4 | 0 |
| 1909*** | 4 | 4 | 2 | 2 | 1 |
| Total . . . | 129 | 33 | 50 | 37 | 4 |

*Marine Review, January 17, 1907, pp. 28-31; Ibid January 2, 1908, pp. 45-46; Ibid January 7, 1909, pp. 38, 48 and 49.
**The beam measurement of these vessels is indicated by the preceding table.
***Under contract to be launched during 1909.

A strong light is thrown on the transportation possibilities of a properly improved Chicago river by the very large volume of traffic moved through the narrow channels connecting the lakes. In a single day 487,649 tons, and in a single year 58,217,214 tons, of freight have moved through the American and Canadian canals at the "Soo." About 73 per cent of this traffic went through the American canal, which is 1.6 miles long and varies in width from 500 feet at the upper entrance to but 108 feet at the canal gate, and to 270 feet at the basin above the locks.

At many places the channel below the falls used to be but 300 feet wide. Up to September 3, 1906, the channel through the St. Clair flats for a distance of about three miles was only 292 feet wide, yet the commerce passing through this canal during the season of 1906 reached the enormous total of 60,589,441 net tons.

To meet our needs our harbors must reach into the heart of the city, so that articles for home consumption, when unloaded from

vessels, will be near the consumer; they must furnish a place for the trans-shipment of through traffic; in the aggregate they must supply a large water frontage for the location of industries, and they must also at one or more points furnish ready access to the open lake for our growing fleet of passenger boats.

For nearly a century the Chicago river has been supplying these four needs. The first requirement it meets better than any other harbor can, because it penetrates far into the city; the second it fulfills because the railroads have expended millions of dollars on terminals along its banks; its many miles of shore line, now immensely increased by the drainage canal, the people's possession, admirably meet the third requirement, and the mouth of the river has long served the fourth requirement.

The Calumet river and lake stand in the same relation to South Chicago as the Chicago river and drainage canal to Chicago proper. And steps should be taken to prevent the mistakes made in the older district from being repeated in the newer one. The extended shore line of Calumet lake will furnish sites for many large industries and a channel through the lake with wharves on either side will give much additional transfer space should it ever be required.

Although poorly provided for, our passenger business, especially the excursion business to the Michigan shore, has grown rapidly. With ready access at all hours to the lake, this business would increase beyond all expectations. Docks, piers and wharves should be constructed just north of the entrance to the Chicago river primarily for the use of boats engaged in the passenger and miscellaneous cargo business.

Easy, rapid and certain communication should be established with the passenger boat landings by the construction of a new street car loop which will tap the main lines of north and south travel and skirt the passenger landings. As population pushes farther and farther around the southern shore of the lake it may be found more expeditious and in the summer more pleasant to go and come by lake. Travel by land will then be very roundabout and through a thickly settled district.

Judged by the criteria I have advanced, a harbor on the lake front between 16th street and Jackson Park would be the least useful of any under consideration. Its only advantage would lie in its accessibility. It would be wholly out of touch with and unrelated to the commercial and industrial life of the city. However, if it is believed that this space will be required for harbor purposes, the St.

Charles Air Line on 16th street and the Boulevard Line on 41st street could be extended over the Illinois Central tracks and a marginal railroad constructed to join the two. The outer harbor could in this manner be made to serve the needs of through traffic, but the requirements of local traffic would remain unsatisfied.

For the boats engaged in the passenger, fruit and miscellaneous cargo business a small harbor at 16th street, having a connection with the St. Charles Air Line, might serve a useful purpose, but I am not convinced of its necessity.

# Appendices

APPENDIX A. Consideration of the various suggestions made for New Channels to take the place of the present Narrow River. Prepared for the Chicago Harbor Commission by Commissioner Frederic A. Delano.

APPENDIX B. Letter to the Harbor Commission from Sub-Committee of Commercial Club Committees on Plan of Chicago.

APPENDIX C. Copies of Laws of Illinois of 1903 and 1907, under authority of which the Board of South Park Commissioners is planning to develop for Park Purposes the Chicago Lake Front from Grant Park to Jackson Park.

APPENDIX D. Statistical Tables.

APPENDIX E. Digest of Hearings.

# Appendix A

## Consideration of the Various Suggestions Made for New Channels to Take the Place of the Present Narrow River

**Prepared for the Chicago Harbor Commission by**
**COMMISSIONER FREDERIC A. DELANO**

The Chicago River is at present the only connection between the Lake and the Sanitary and Ship Canal. If the project for deepening the Illinois River and the Mississippi River for a Lakes-to-the-Gulf Deep Waterway is carried through, then the Chicago River will become a thoroughfare of considerable importance; and the question naturally arises whether it is adequate for such uses in addition to its other uses, and if not, how it can be made adequate, or how it can be supplemented in some other way.

Two ways of supplementing it have been suggested: One is to use to the North Shore Canal (also called the "Wilmette Channel" and the "Evanston cut-off"), which is now building; the other is to use the proposed Calumet "Sag" Channel. The former will obviously mean a long, circuitous course, much of which is through the crowded part of the city, and for that reason it is, without doubt, the least available. The latter cannot be settled upon until the United States Government has given its consent, and, indeed, it may possibly involve international questions. Furthermore, the Sag route has been opposed locally, on the theory that any development in that direction would be at the expense of the development of the Chicago River. In suggesting it, the writer certainly has no such thought, his thought being simply that because the Chicago River runs through the heart of the business center of Chicago, crossed by many important thoroughfares, and considering the inconvenience to the public due to the opening of the bridges, it ought, if possible, to be supplemented and relieved as far as possible of all unnecessary burdens. The widening of Calumet River and the development of an inner harbor on Calumet Lake, both, would lend themselves to the use of the Sag Channel as a good and convenient means of ingress and egress for traffic seeking the Lakes-to-Gulf Waterway, and, therefore, this route ought to be most carefully considered and its advantages and cost carefully determined. It would be a pity to dig this "Sag" Channel so narrow or so shallow that it would serve no purpose for navigation. Indeed, it would seem that to make the channel less than 150 feet in width or 14 feet in depth, would be a very serious blunder.

In connection with the North Shore Canal, it would seem likely that its usefulness as a means of acess either to the North Branch of

the river or to the river itself might have been greatly enhanced if the channel had been cut about on a line, say of Montrose avenue, or any other convenient point between there and the south line of Evanston, and made wide enough and deep enough for any vessel now entering the North Branch; but, as a matter of fact, a narrow channel is being cut from Wilmette down to an intersection of the North Branch at Bowmanville. Property for the channel is being purchased 600 feet wide, but the channel itself is being cut only 90 feet in width and quite shallow, and with no provision for movable bridges. The intake of this channel at Wilmette is about fifteen miles (in a straight line) north of the mouth of the river.

Many other suggestions have been made to your Commission, looking to development in other directions. It has been pointed out that when smaller vessels were used, and before the necessity for bridges became so great, no better means of distributing raw material and produce destined to or from Chicago proper and for the factories near our city could ever have been devised. The reasons why the Chicago River is no longer entirely satisfactory are, briefly, as follows:

1. It is neither straight enough, nor wide enough, to afford a good thoroughfare and at the same time permit the tying up of vessels along its banks;

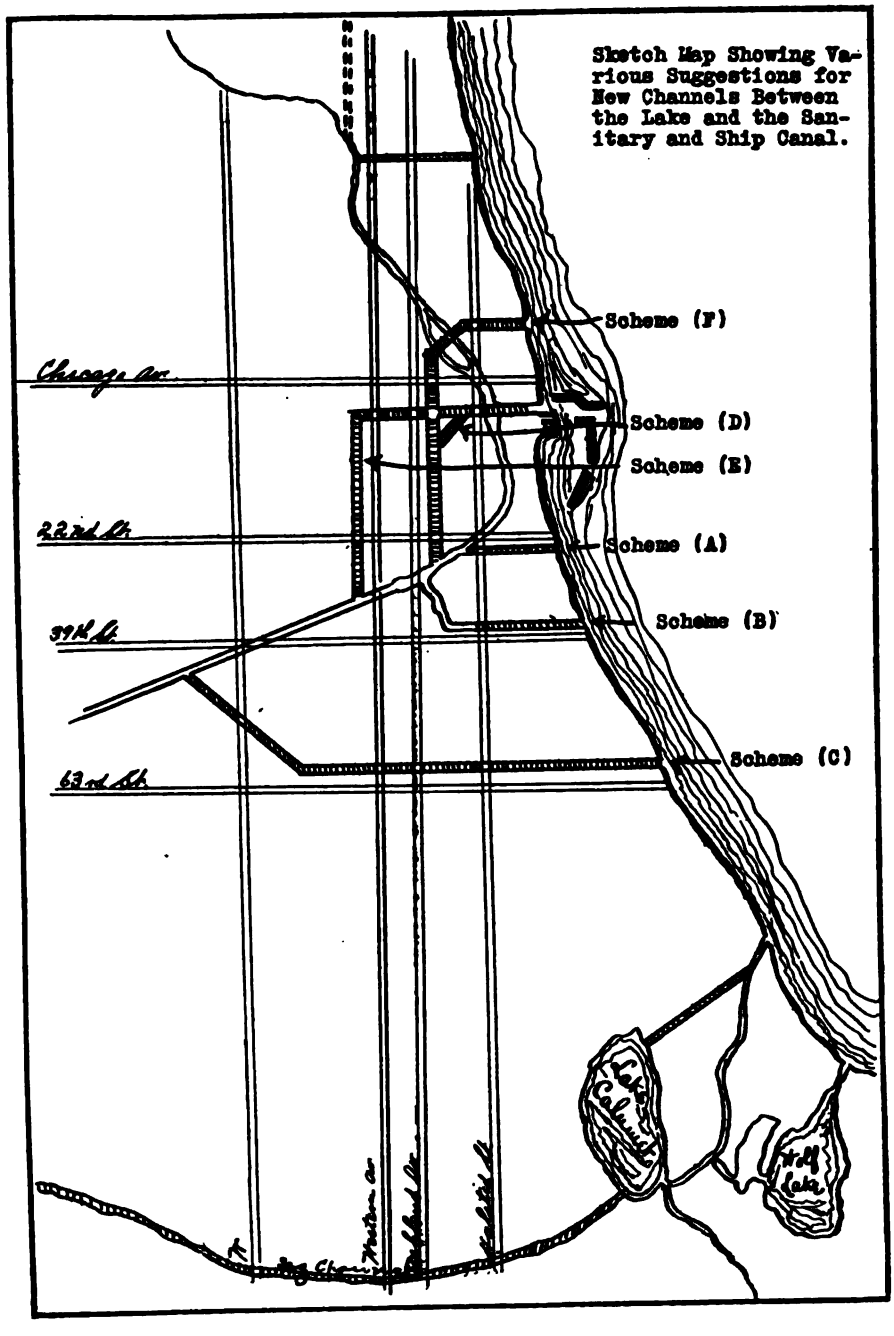
2. The current is too swift for navigating large craft in a thoroughfare impeded by frequent bridges, etc.;

3. It divides a great city into three sections, compelling the building and maintenance of many expensive bridges;

4. The existence of the river crowds and hampers the business section, hinders the natural development of the city, and the opening of the bridges causes a serious inconvenience to the public.

How to preserve to the city the advantages which it once enjoyed with the river and to remove some of the objectionable features above referred to has been the subject of serious consideration by your Commission, and it has listened attentively to many suggestions which have been made. It has been pointed out that to further widen and straighten the present river would cost many millions, involve endless litigation, and perhaps even then be impossible of accomplishment to any effective extent; and it may here be pointed out that one thing which has added much to the cost of widening and straightening the river, even as thus far done, has been the fact that there has been no way of assessing back any of the benefits to the abutting shore owners, part of whose property is taken. Thus, while the public has paid dearly for property taken, owners have had the value of their remaining property greatly enhanced at the expense of the general public.

To meet these difficulties, suggestions made for the improvement of the river have been chiefly along the line of cutting a new channel and abandoning a portion of the present channel, using fixed bridges over the abandoned portions of the present river, and possibly eventually abandoning those portions altogether. These various suggestions and the arguments for and against them will be briefly touched upon:


Sketch Map Showing Various Suggestions for New Channels Between the Lake and the Sanitary and Ship Canal.
Scheme (F)
Scheme (D)
Scheme (E)
Scheme (A)
Scheme (B)
Scheme (C)
Chicago Av.
22nd St.
39th St.
63rd St.
Lake Calumet
Hyde Park

(A) A new channel between, say, Twelfth and Twenty-fourth streets, from the river to the lake, making a new harbor entrance at the lake mouth and abandoning the present main stem of the river between Market street and the Lake Front. It would be proposed to make this new channel at least three hundred feet wide, but to secure at the time of condemnation a strip of ground not less than six hundred feet wide, so as to control the banks on each side of this proposed canal, not only for the possible necessity of a future widening of this channel, but also to control the uses to be made of the banks. This channel would be scarcely more than a mile in length, but would run through very valuable property. Undoubtedly the cutting of any such channel would be opposed in the most vigorous manner, and it would be argued by the people living on the South Side that an additional obstacle between their section of the city and the business district which had never existed was being established. It should be borne in mind, however, that in building such a channel, the more important streets should be provided with subways for the street car traffic, as well as overhead bridges for the less important traffic.

Another serious obstacle to this plan is that such a channel would be a very serious hindrance to the railroads who have established themselves there and who would undoubtedly oppose it very vigorously. However, the opposition of these public corporations would be insignificant compared with the opposition of the people of the South Side. The business heart of the city exists in the northern end of the South Side peninsula. The South Side is in direct and unobstructed communication with this business center, and it has a vast advantage by reason of this fact, an advantage which property owners there would not yield without a struggle akin to that which they would make for the right to exist. As before said, the business center is at the northern end of the South Side. For some subtle reason, this location has attracted to itself the concentration of Chicago's business development. Here are its great stores; here are intrenched its banking interests; here its great office buildings; here the seat of civic government; here its art treasures, and here centers the Federal power in this State. All these, by natural selection, have identified themselves with the South Side, and from these the South Side will not be divorced by any artificial creation. More than six hundred thousand people, aroused and contending for their birthright, cannot be satisfied by theories of what ought to be.

(B) An alternative route for a cut-off would be at Thirty-ninth street, by the extension of the south fork of the South Branch from Halsted street to the lake, a distance of about two and one-half miles. The arguments in this case are much as in the case of (A); the obstacles in the way are less serious, but still very great.

(C) Another route suggested for the consideration of the Commission is that on the line with the Midway Plaisance, with a harbor entrance at Jackson Park, cutting a channel straight west on this line to Central Park avenue, thence on a curved or diagonal line to a connection with the Sanitary and Ship Canal. This involves a canal about

eight miles long, but, of course, the value of realty, which is in every case the largest item, is much less.

(D) Another suggestion is that the main harbor entrance be left as it is, the main stem of the river widened and straightened and carried west from the present forks of the river at Market and Lake streets along parallel to Lake street and then curved to the south parallel to Ashland avnue, and near that point intersecting the present Sanitary Canal and turning basin near Ashland avenue. The merit of this plan lies in the fact that it would enable the putting of fixed bridges on that portion of the river from Lake street to Canal street. It would enable the West Side to have far better communication with the downtown district than it now has, and, while a new channel would be created through the West Side, the important surface lines of transportation could readily be carried under it. The cost of a new channel three hundred feet wide would be very great, but it is doubtful if it would be any greater than the cost of widening and straightening the present river; and if the legislation providing for it permitted the taking of property to a width of, say, six hundred feet (this was done in the case of the Sanitary Canal), or, say, the entire width between two streets, the rental value of the banks would go a long way toward paying interest on the cost of the improvement.

(E) A similar plan to Plan (D) has been suggested, with the exception that the main stem of the river, parallel to and along Lake street, would be carried to Rockwell street and thence south to a connection with the Sanitary Canal. The idea of this plan is similar to that of Plan (D), namely, to change the course of the river so as to put a large part of what is now the West Side into the business section. The canal would be considerably longer than in the first case, but the property taken would be less valuable. It should be borne in mind that the cost of digging the canal in any of these cases is small as compared with the cost of the property.

(F) A plan similar to the above, and perhaps a little more ambitious, is to make a new harbor entrance north of Chicago avenue, say, at some point between Chicago avenue and North avenue, or perhaps through the southern edge of Lincoln Park, connecting with the North Branch by a wide, straight channel, thence southwest to the North Branch at Goose Island, thence south on some one of the routes already discussed to intersect the Sanitary Canal. The idea of this plan is, of course, to extend the business center of the city, not only to the west, but also to the north, and to enable the use of fixed bridges on all that portion of the North Branch of the river below Chicago avenue, and also on the main stem of the river, and of the South Branch as far as Canal street. The river is treated as if it were a belt railroad, and swung clear around clear of the business center, instead of being projected through it.

In all these suggestions, it may be argued that the cost makes them prohibitive. In all probability the cost would amount to thirty to sixty millions of dollars, according to the plan selected—a very large sum of money—and yet, perhaps not a prohibitive sum when

the benefits derived are fully considered. It requires no great flight of the imagination to see such a channel properly constructed. A wide, straight channel of clear water, its banks properly protected with concrete walls, provided with a continuous dock for receiving and distributing freight, and even passengers; provided, also, with suitable electric tramway tracks for collecting and distributing freight; and last, but not least, having on one or both of its shores overhead boulevards of arched concrete construction (giving ample warehouse space beneath), which might easily be made a feature of great interest in our city.

It should never be forgotten that Chicago has an immense natural waterway at its door, the Great Lakes. The expense of availing ourselves of it is insignificant as compared with the advantages. We have already spent nearly sixty millions of dollars for the Sanitary and Ship Canal; in other words, in order to prevent the further pollution of our drinking water. A sum no greater would give us the greatest internal waterway and harbor which any city in the world possesses, and at the same time contribute to the general appearance and convenience of the city.

It may be argued with a great deal of justice that it is not fair to expect Chicago to provide this herself; that it is only fair that the State and the general Government, which are to participate in the advantages of this great work, should share in the expense. Such an improvement, financed by means of a bond issue, spreading the interest and sinking fund payments over a long period of years, would be a small burden on either the general Government, the State or the City, and, looked at from that light, would appear to be not an unfeasible nor an unreasonable plan, if the Lakes-to-the-Gulf Waterway is really to be a national undertaking.

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(Copy of photograph No. 1 accompanying letter to the Harbor Commission from Commercial Club Committee)

View looking south over the lagoon of the proposed outer parkway designed to extend from Twelfth Street to Jackson Park. From a water color made for the Commercial Club of Chicago by Jules Guerin.

# Appendix B

## Letter to the Harbor Commission from Sub-Committee of Commercial Club Committees on Plan of Chicago

January 7, 1909.

*To the Chicago Harbor Commission:*

Gentlemen—We write to confirm in definite and concrete terms the views which we explained orally to your honorable body at some length on Monday, January 4th. In answer to your questions, the points which we desire to emphasize are as follows:

(1) The population of Chicago which resides north of Chicago avenue has free and ample access to the lake front. No parks in the world are used more in proportion to their area than Lincoln Park and the Lake Shore drive. A large proportion of the population of the city resides south of 12th street and north of 51st street, and have no easy access to the lake, being cut off from it by the Illinois Central Railroad. These people need a lake front park.

The plan for the outer parkway extending from 12th street to Jackson Park provides a strip of lawn and trees and shrubs adjacent to and east of the Illinois Central right of way. This strip of shore park is bounded on the east by a lagoon available for pleasure craft, east of which is a wide parkway, with open meadows and ample park facilities. At intervals fixed bridges connect this parkway with the east and west streets of the South Side. The plan for this outer parkway is shown in photograph No. 1, herewith inclosed.

Convinced that this is a very necessary and desirable improvement, our Lake Parks Committee co-operated with the South Park Commissioners in securing legislation authorizing the commissioners to purchase the riparian rights of shore owners and proceed with the improvement. The park commissioners have made soundings and are prepared to proceed. In deference to your honorable body, they have awaited your report before proceeding under the law.

We therefore ask that you take cognizance of this outer parkway in your report exactly as you recognize the existence of the Lake Shore drive and Lincoln Park, north of Chicago avenue.

(2) We believe that no harbor should be designed for the water front of Chicago which does not take advantage of our greatest water front asset—viz., the fact that the waters of Lake Michigan are shallow for a long distance from the present shore line. Long and ample harbors can be created for Chicago by extending piers straight into the lake. They can be progressively developed as needed.

In our plan for the lake front, two great piers one and one-half miles long have been indicated extending into the lake south of Chicago

avenue and north of 22d street. The depth of the water at the end of these piers is about thirty feet. The depth of the water at the present four-mile crib is only thirty-eight feet.

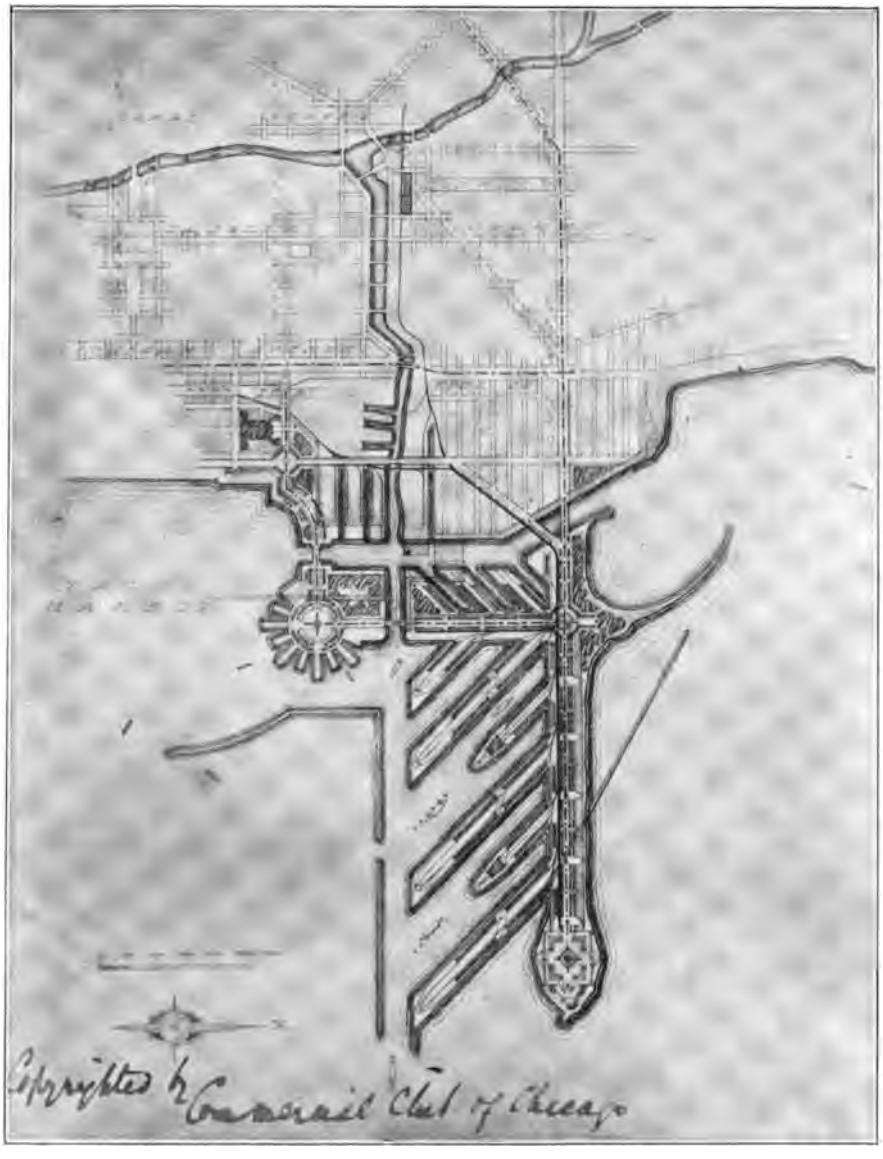
We favor an outer harbor to consist of a long pier projecting into the lake at or south of Chicago avenue, with lateral piers extending therefrom in a southerly direction, approximately as shown in photograph No. 2, inclosed herewith. We submit this not as an actual working design for the construction of such a harbor, but as a suggestion which has been made to us by an expert harbor engineer in the employ of the United States government. If this pier were projected, approximately ten miles of dock frontage would be created. This frontage could be trebled or quadrupled by extending the harbor farther into the lake. Such a harbor is entirely feasible. It provides ample facilities near the river mouth, without interfering with the use of the shore line of the Lake Shore drive and Lincoln Park as a pleasure ground for the people.

In New York, where a deep, narrow, tidal river fronts the city, and in many other seaports, it is necessary to blanket the water front with docks. It is not necessary in Chicago, for the reason above stated. The outer harbor which we recommend is an inexpensive one. Let dumping companies be required to dump spoil in certain specified areas protected by a line of piling and about seventeen acres of surface will emerge above the lake level yearly, without any expense to the city.

In our opinion, no further harbor development other than the river mouth harbor indicated above, will ever be required, between the Chicago river and the Calumet region, by the commercial interests of the city. We believe that the twenty or more miles of docks which can be created at the river mouth harbor will be ample for the package freight and passenger service of downtown Chicago. Add to this the immense capacity, actual and potential, of the inner harbor offered by the shores of the Chicago river and the Drainage canal; add also the great capacity of a still larger outer harbor which can be built at the mouth of the Calumet, and of the inner harbor which can be cheaply constructed in Lake Calumet itself and along the line of the Calumet river and the Sag; and we ask, is it not apparent that the harbor capacity of Chicago is enormous and ample for all time, without blanketing the shore line with docks either north of Chicago avenue or south of 12th street?

(3) It has been suggested that the shore line from 16th street to 41st street should be blanketed with a line of docks. We oppose such a harbor, because it destroys the value of the outer parkway, and it fails to take advantage of the asset which we possess in our comparatively shallow water front. If any such harbor were to be placed between the Chicago river and Jackson park, it should be constructed east of the St. Charles Air Line at 16th street, which now has four elevated tracks, on the principle suggested for the river-mouth harbor. Seventeen railways would connect with such a harbor at 16th street, without blanketing the entire water front for all time.

(4) In closing, may we call your attention to the great importance of harmonizing the views of such public-spirited bodies as the Harbor Commission, the park boards, and associations of citizens, to the end that Chicago may proceed promptly to enjoy the benefits of great public




**(Copy of photograph No. 2 accompanying letter to the Harbor Commission from Commercial Club Committee.)**

**Tentative plan of docks between mouth of Chicago River and Chicago Avenue, for package freight and passenger business. The long pier, from which the docks extend in a southerly direction, is the extension eastward of Chicago Avenue. North of the pier is shown a yacht harbor and connection with the north park system of the city.**

improvements now in prospect. We therefore urge the importance of avoiding any general recommendations or reservations which leave the subject "in the air," indefinite and unsettled, and which might result in arresting for a period of years the development of all these movements for the betterment of Chicago.

If the Harbor Commission decides that it is necessary to make some reservation for an outer harbor opposite 16th street, we ask that your recommendation specifically call attention to the fact that such a harbor can be created along the lines described in this letter without blanketing the shore line, and without interfering with the outer parkway, provided an agreement is now reached with the park commissioners under the terms of which ample access for railroads and for traffic streets shall be provided by bridges crossing the outer parkway and connecting the harbor with the railroad and street system of the city.

In our opinion, any further reservation for harbor purposes between 16th street and Jackon Park is unnecessary, unwise and objectionable; unnecessary, because the possible harbor development already indicated above is ample for present and future requirements; unwise, because the reservation of the right to throw a warehousing pier out from 41st street implies the development of east and west freight railroad facilities, to serve such a pier, in the heart of a well-settled residence district; objectionable, because it carries additional smoke nuisance and lake pollution into the heart of what is and always should be an attractive residence district.

There are difficulties enough in securing harmonious agreement between the various governing bodies and groups of citizens in Chicago on the question of great public improvements without bringing into the situation any projects of doubtful utility.

Respectfully submitted,

E. B. BUTLER,
W. H. WILSON,
CHARLES D. NORTON,

Sub-Committee of Commercial Club Committees on Plan of Chicago.

# Appendix C

## Copies of Laws of Illinois of 1903 and 1907, Under Authority of which the Board of South Park Commissioners is Planning to Develop for Park Purposes the Chicago Lake Front from Grant Park to Jackson Park

### LAW OF 1903

AN ACT to enable Park Commissioners having control of a park or parks bordering upon public waters in this State, to enlarge and connect the same from time to time by extensions over lands and the bed of such waters, and defining the use which may be made of such extensions, and granting submerged lands for the purpose of such enlargements. (Approved May 14, 1903. In force July 1, 1903.)

**Power to Extend Park or Driveway Over Bed of Waters:** Section 1. Be it enacted by the People of the State of Illinois represented in the General Assembly: That every Board of Park Commissioners existing under the laws of this State, which now has, or may hereafter have, or acquire, control over any public park, boulevard or driveway, bordering upon any public waters in this State, shall have the power to extend such park, boulevard or driveway over and upon the bed of such public waters: Provided, however, that no such extension shall be made which shall interfere with the practical navigation of such public waters, for the purposes of commerce, without due authority from the proper official of the United States Government having control thereof.

**Power to Connect Separate Parks by Driveway Over Bed of Public Waters:** Section 2. Every Board of Park Commissioners existing under the laws of this State which now has, or may hereafter have, or acquire, control over two or more separate public parks, whether they constitute a part of one park system or not, bordering upon any body of public water in this State, shall have power to connect the same by constructing a boulevard, driveway or parkway extending over and upon the bed of such public waters, and over and upon any lands penetrating into such waters, and may extend any such park by constructing a boulevard, driveway or parkway over any private property, and over any navigable river or any part thereof which lies within the territory, the property of which shall be taxable for the maintenance of the park under the control of said Board, so as to connect such boulevard, driveway or parkway with any boulevard, driveway or parkway now or hereafter constructed, and connected with or forming a part of any other park system; and in

extending such park or in constructing such boulevard, driveway or parkway, the said Board of Park Commissioners may construct such viaducts, bridges or tunnels, or parts of viaducts, bridges or tunnels within its said territory as to it may seem necessary: Provided, however, that no such extension which shall be made, shall interfere with the practical navigation of such public waters or rivers for the purposes of commerce, without due authority from the proper official of the United States Government having control thereof.

**Acquisition of Riparian Rights:** Section 3. The riparian or other rights of the owners of land on the shores adjoining the waters or rivers in which it is proposed to construct any such extension or connection, the title of the private owners, if any there be, of lands lying beneath such public waters or rivers, and the title of the owners of any lands penetrating into such public waters or of any land into, upon, or over which it is proposed to construct such extension or connection, or viaduct, bridge or tunnel, may be acquired by the said Board of Park Commissioners by contract with, or deeds from, any such owner or owners, and such Park Commissioners shall have the power to pay for any such rights, lands or territory, thus acquired, out of its general revenue.

**Title:** Section 4. The title to any such extension or connection of such park or parks, boulevards, driveways and parkways, and to the bed thereof shall be, and thereby become vested in such Board of Park Commissioners for public purposes, and the same shall thereby become a part of the public park or parks under the control of such Board, and shall thenceforth be maintained and controlled by such Board in the manner provided by law, for the government and maintenance of other parks, boulevards and driveways under its control, and in all cases where any boulevard, driveway or parkway is extended, or constructed, under the provisions of this act, the title to the submerged lands lying between the shore of such public waters and the inner line of the extension of such boulevard, driveway or parkway, shall be, and thereby become vested in such Board of Park Commissioners; and in case any such extension or connection as provided in this act shall be made into, over or upon the bed of Lake Michigan by any such Board of Park Commissioners, then the right, title and interest of the State of Illinois, in and to the bed of so much of said Lake Michigan shall be vested in such Board of Park Commissioners as in other cases provided in this act, and for the same purposes and with the same rights and power.

**Extension Restricted to Taxable District:** Section 5. No such Board of Park Commissioners shall be hereby authorized to extend any of its park or boulevard system outside of or beyond the limits of the district or territory, the property of which shall be taxable for the maintenance of the parks under the control of such Board, except into, over, and upon public waters or rivers adjoining or being a part of such district.

# LAW OF 1907

AN ACT authorizing park commissioners to acquire and improve submerged and shore lands for park purposes, providing for the payment therefor, and granting unto such commissioners certain rights and powers and to riparian owners certain rights and titles. (Approved May 2, 1907. In force July 1, 1907.)

**Power to Acquire and Improve Submerged and Shore Lands for Park Purposes:** Section 1. Be it enacted by the People of the State of Illinois, represented in the General Assembly: That every board of park commissioners existing under the laws of this State, which now has or may hereafter have or acquire, control over any public park, boulevard or driveway, bordering upon any public waters in this State, and which now has, or may hereafter have or acquire, the power to extend such park, boulevard or driveway over and upon the bed of such public waters, and that every board of park commissioners, which now has, or may hereafter have or acquire, control over two or more separate public parks, whether they constitute a part of one park system or not, bordering upon any public waters in this State, and which now has, or may hereafter have or acquire, power to connect the same by constructing a boulevard, driveway or parkway extending over and upon the bed of such public waters and over and upon any lands penetrating into such waters, may acquire the riparian or other rights of the owners of lands, whether individuals or corporations, on the shores adjoining the public waters or rivers in which it is proposed to construct any such extension or connection, also the title of the private or public owners, if any there be, to lands lying beneath such public waters or rivers, also the titles of any lands penetrating into such public waters and the title of any lands into, upon, or over which it is proposed to construct such extension or connection, or any viaduct, bridge or tunnel forming a part thereof, by contract with or deed from any such owner or owners, whether individuals or corporations. Said park commissioners and said riparian owners are hereby authorized to agree upon a boundary line dividing the submerged lands acquired or to be acquired by said park commissioners and the submerged lands to be taken, owned and used by said riparian owners in lieu of and as compensation for the release of said riparian rights to said park commissioners. In case any of such owners or persons interested are non sui juris, or in case any of such owners or persons interested are unknown, proceedings may be had to condemn their riparian rights and the lands owned by them, or in which they may be interested, according to the provisions of an act entitled "An act to provide for the exercise of the right of eminent domain" and amendments thereto.

**Petition in Chancery to Establish Boundary Line:** Section 2. In all cases in which said park commissioners shall have acquired, or contracted to acquire, the riparian rights of the owners of any lands along the shore adjoining such submerged lands, and shall have agreed upon the dividing line aforesaid, said park commissioners shall file petitions or bills in chancery on the chancery side of the Circuit court of the county in which said lands are situated, praying that the boundary line between the

lands acquired or to be acquired by the defendants in said suit and the lands acquired or to be acquired by the said park commissioners, under this act and under such contract or contracts, may be established and confirmed by the decree of said court, as agreed upon by said parties to which bills or petitions all persons interested in said riparian rights and lands as owners or otherwise as appearing of record, if known, or not known, stating that fact, shall be made defendants. Persons interested, whose names are unknown, may be made parties defendant by the description of the unknown owners; but in all such cases, an affidavit shall be filed by or on behalf of the petitioner or complainant, setting forth that the names of such persons are unknown, said park commissioners shall also give public notice of the filing of each such bill or petition by publication thereof once a week for four consecutive weeks in a newspaper of general circulation regularly published in the city in which, or nearest to which said riparian rights are situated, which notice shall contain the title of the suit and the term of court at which it is made returnable, the last of which notices shall be published not less than ten (10) days or more than twenty (20) days before the first day of the term of court in which said suit is returnable. The defendants who did not enter their appearance shall be served with process in the suit so instituted in the same manner as in suits in chancery, and the proceedings in said cause shall be conducted in the same manner as in other suits in chancery. Any legal voter or taxpayer within the district or territory in which the property shall be taxable for the maintenance of the park system under the control of such commissioners, shall be permitted to enter his appearance and become a party defendant in said proceedings and demur, plead or answer to said bill or petition. If, upon a hearing, the court shall find that the rights and interests of the public have been duly conserved in and by such agreement, then the court shall confirm said agreement and establish such boundary line; otherwise the court shall, in its discretion, dismiss such bill or petition. If the dividing line agreed upon shall be so established and confirmed by the decree or judgment of the said court, it shall thereafter be a permanent dividing and boundary line of said lands, and shall not be affected or changed thereafter, either by accretions or erosions; and the owners of said shore lands are hereby granted by the State of Illinois the title to the submerged lands lying between said boundary line when so established and the shore adjacent thereto, and they shall have the right to fill in, improve, protect, use for all lawful purposes, sell and convey said submerged lands up to the line so established, free from any adverse claim in any way arising out of any question as to where the shore line was at any time in the past, or as to the title to any existing accretions.

**May Pay Out of General Revenues or by Issue and Sale of Bonds—Conditions Governing Issue of Bonds:** Section 3. Such park commissioners shall have the power to pay for any such rights or lands thus acquired and for the construction and protection of such extension or connection, either out of its general revenues or by the issue and sale, from time to time, of interest-bearing bonds, in addition to the bonds now authorized by law to be issued and sold by such park commission-

ers: Provided, no bonds shall be issued under this act contrary to the provisions of Section 12, Artivle IX, of the Constitution of this State: And provided, further, that the proposition to issue such bonds shall first be submitted to a vote of the legal voters of such park district and shall receive a majority of the votes cast upon such proposition. And authority is hereby expressly granted to the park commissioners issuing such bonds to levy and collect a direct annual tax upon the property within their jurisdiction, in addition to the amount of any tax now authorized by law to be levied and collected by them, sufficient to pay the interest on said bonds as it falls due, and also to pay and discharge the principal thereof within twenty (20) years from the date of issuing said bonds; and the county clerk of the county in which such park district is located or such other officer or officers as are by law authorized to spread or assess taxes for park purposes shall, on receiving a certificate from such park commissioners that the amount mentioned in such certificate is necessary to pay the interest on said bonds and also to pay and discharge the principal thereof within twenty (20) years from the date of issuing said bonds, spread and assess such amount upon the taxable property embraced in said park district the same as other park taxes are by law spread and assessed, and the same shall be collected and paid over the same as other park taxes are required by law to be collected and paid.

**Powers under Act not Exhausted:** Section 4. The powers granted by this act to any board of park commissioners shall not be construed to have been exhausted by any one use of the same, but said commissioners may, from time to time, proceed with further enlargements or extensions: Provided, however, that all such enlargements or extensions lie within the district or territory, the property in which shall be taxable for the maintenance of the park systems under the control of such commissioners, or within public waters or rivers adjoining or being a part of such district or territory.

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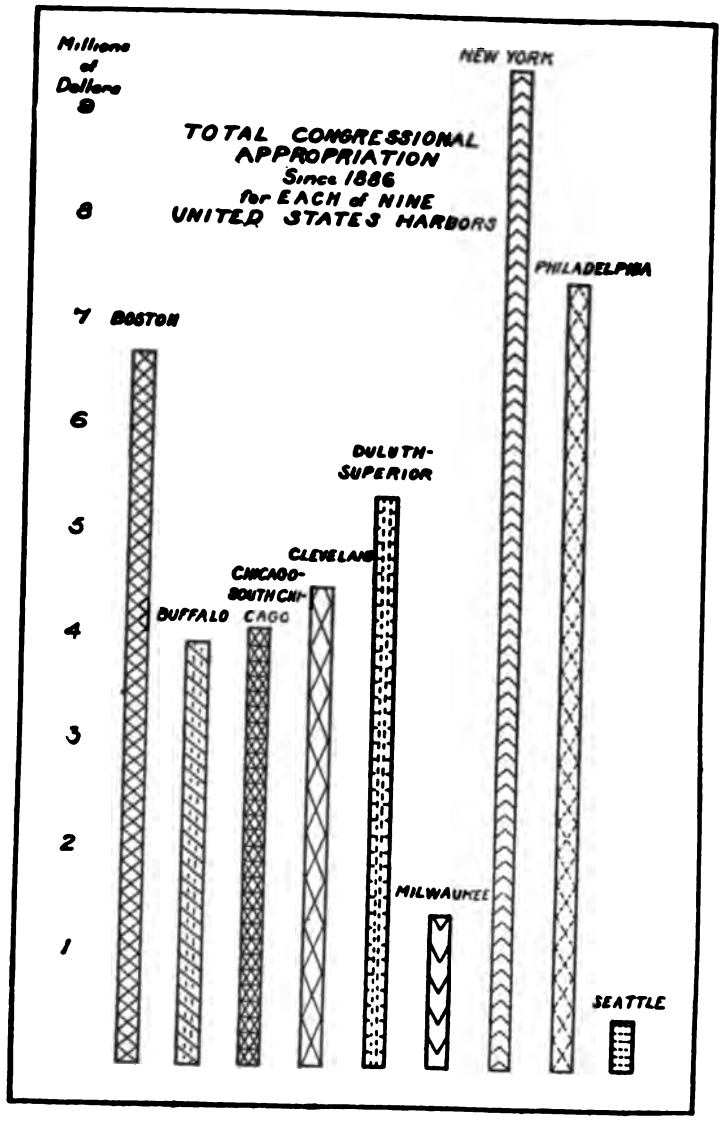
CONGRESSIONAL APPROPRIATIONS FOR CERTAIN UNITED STATES HARBORS SINCE 1886.

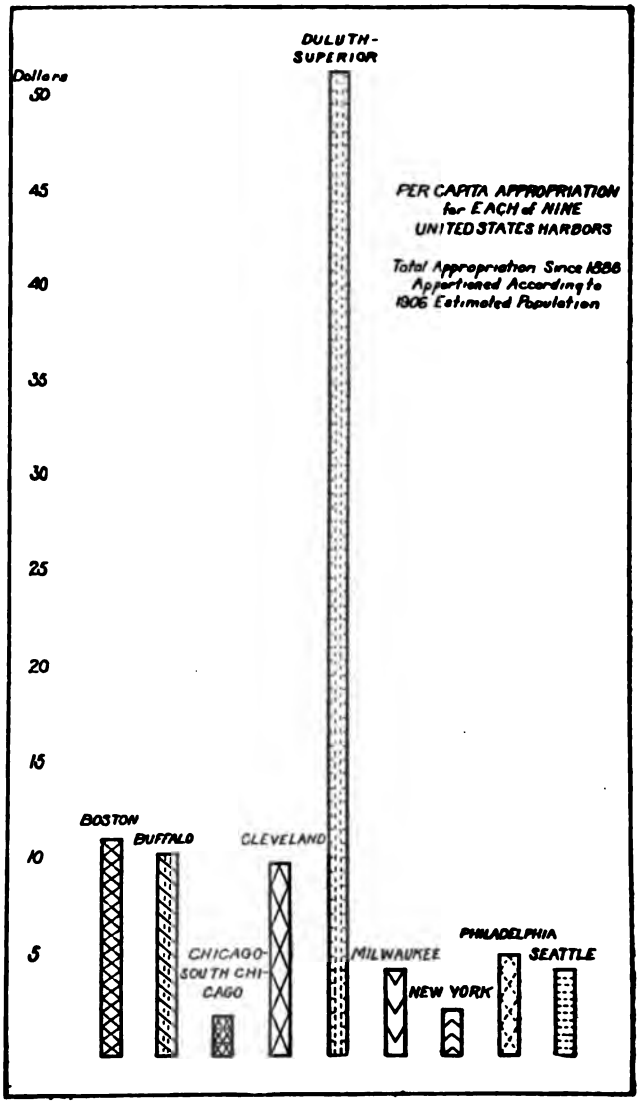
| | Boston | Buffalo | Chicago–South Chicago | Cleveland | Duluth–Superior | Milwaukee | New York * | Philadelphia Delaware River | Seattle |
|---|---|---|---|---|---|---|---|---|---|
| 1886 | $56,250 | $112,500 | $165,000 | $93,750 | $78,750 | $60,000 | $813,750 | $210,000 | ..... |
| 1888 | 125,000 | 225,000 | 220,400 | 100,000 | 130,000 | 80,000 | 540,000 | 250,000 | ..... |
| 1890 | 145,000 | 300,000 | 170,000 | 75,000 | 165,000 | 92,000 | 320,000 | 240,000 | ..... |
| 1892 | 300,000 | 300,000 | 162,000 | 100,000 | 195,000 | 89,000 | 468,600 | 50,000 | ..... |
| 1894 | 200,000 | 70,000 | 140,000 | 50,000 | 125,000 | 52,000 | 275,000 | 170,000 | $25,000 |
| 1896 | 70,000 | ..... | 175,000 | 80,000 | 50,000 | 27,000 | 286,000 | 500,000 | 150,000 |
| 1897 | 400,000 | 481,250 | 117,000 | 350,000 | 437,500 | 168,737 | 226,000 | ..... | ..... |
| 1898 | 250,000 | 489,746 | 400,000 | 294,000 | 770,138 | ..... | 226,000 | ..... | ..... |
| 1899 | 238,751 | 560,498 | 310,000 | 175,000 | 300,000 | 76,000 | 1,200,000 | 300,000 | ..... |
| 1900 | 317,000 | ..... | 247,350 | 175,000 | 793,187 | 105,650 | 263,500 | 270,500 | ..... |
| 1901 | 133,000 | 400,000 | 255,000 | ..... | 320,000 | ..... | 470,000 | 61,500 | ..... |
| 1902 | 875,000 | 230,000 | 596,457 | 732,000 | 759,727 | 232,500 | 590,000 | 600,000 | 160,000 |
| 1903 | 150,000 | ..... | 204,480 | 227,500 | ..... | ..... | 1,110,000 | 1,400,000 | ..... |
| 1904 | 350,000 | ..... | 43,000 | 485,200 | ..... | ..... | 440,000 | 1,000,000 | ..... |
| 1905 | 1,070,000 | 293,506 | 300,000 | 830,800 | 270,000 | 250,000 | 1,090,510 | 500,000 | 125,000 |
| 1906 | 600,000 | ..... | 156,000 | 350,000 | 100,000 | ..... | 315,000 | 1,000,000 | ..... |
| 1907 | 1,480,000 | 533,436 | 481,500 | 423,000 | 925,000 | 200,000 | 895,000 | 895,000 | 10,000 |
| Total | $6,760,001 | $3,995,936 | $4,143,187 | $4,541,250 | $5,409,302 | $1,432,887 | $9,529,360 | $7,447,000 | $470,000 |

* "New York Harbor," East (Ambrose) Channel, Bay Ridge and Red Hook Channels, Governors Island Improvement.


Millions of Dollars
9
8
7
6
5
4
3
2
1
TOTAL CONGRESSIONAL APPROPRIATION Since 1886 for EACH of NINE UNITED STATES HARBORS
BOSTON
BUFFALO
CHICAGO-SOUTH CHICAGO
CLEVELAND
DULUTH-SUPERIOR
MILWAUKEE
NEW YORK
PHILADELPHIA
SEATTLE

**PER CAPITA APPROPRIATION.**
**Total Congressional Appropriation for Each City Since 1886 Apportioned According to 1906 Estimated Population.**

| Boston | Buffalo | Chicago-South Chicago | Cleveland | Duluth-Superior | Milwaukee | New York | Philadelphia | Seattle |
|---|---|---|---|---|---|---|---|---|
| $11.22 | $10.47 | $2.02 | $9.86 | $51.52 | $4.51 | $2.32 | $5.17 | $4.51 |


PER CAPITA APPROPRIATION
for EACH of NINE
UNITED STATES HARBORS
Total Appropriation Since 1886
Apportioned According to
1906 Estimated Population
Dollars
50
45
40
35
30
25
20
15
10
5
DULUTH-
SUPERIOR
BOSTON
BUFFALO
CHICAGO-
SOUTH CHI-
CAGO
CLEVELAND
MILWAUKEE
NEW YORK
PHILADELPHIA
SEATTLE

# Report of the Number of Vessels on the Great Lakes —Number Constructed During the Past Decade —Size, Tonnage and Materials Used in Construction—Freight Carried and Number of Clearances Made.

During the last decade, 1896-1906, the tonnage of the vessels on the Great Lakes has increased from 1,324,068 gross tons to 2,234,432 gross tons, a gain of 910,364 gross tons, or 69 per cent. (These figures were obtained from the Report of the Commissioner of Navigation, House Documents, Vol. 30, p. 7, 1906.)

In 1889 there were 2,727 vessels of all kinds on the Great Lakes and St. Lawrence River, belonging to the United States, with a total tonnage of 920,294 gross tons; at the close of 1906 there were 2,990 vessels of all kinds on the Great Lakes and St. Lawrence River belonging to the United States, with a total tonnage of 2,392,863 gross tons. (These figures were obtained from Bulletin 91, Department of Commerce and Labor, 1906.) This shows an increase of only 9.2 per cent in the number of vessels, while the increase in tonnage during the same period is 160 per cent.

On June 30, 1905, the Merchant Marine of the United States, including all kinds of documented shipping, comprised 24,681 vessels of 6,456,543 gross tons. The Northern Lakes on this date, including all kinds of documented shipping, comprised 3,011 vessels of 2,062,147 gross tons.

On June 30, 1906, the Merchant Marine of the United States, including all kinds of documented shipping, comprised 3,052 vessels of 3,234,432 gross tons. This shows that during one year, 1905-1906, the Merchant Marine of the Northern Lakes has grown from one-third to one-half of the gross tonnage of the entire Merchant Marine of the United States. (Report of Commissioner of Navigation, p. 11, 1906.)

The general tendency in the construction of vessels on the Great Lakes, as shown by Tables 1, 2, 3, is toward a larger vessel constructed of steel and propelled by steam.

The first 500-foot vessel constructed on the Great Lakes was built in 1904. (Blue Book of American Shipping, p. 149, et seq., 1907.) Seventeen such vessels were built in 1905 and 45 in 1906, this being nearly one-fourth of the total number of vessels built in 1906. The dimensions of the largest vessel constructed in 1906 are: Keel, 585 feet; beam, 60 feet; capacity, 7,769 gross tons, 5,943 net tons. Practically all of these vessels are constructed of steel. Sixty-eight per cent of all the vessels built in 1906, capable of carrying freight, were constructed of steel. This is a decided increase over the past years.

Very few sailing vessels are being built for freighting purposes, as is shown by Table 2, and many of those that were constructed at an earlier date are now being used as barges.

The proportion of freight carried on the Great Lakes to the total freight traffic of the United States has been increasing slowly. (These data were taken from the report of the Bureau of Statistics, pp. 225, 540, 1907.) The total number tons of freight carried by rail in the United States in 1901 was 1,084,066,451 tons. The total number tons of freight carried on the Great Lakes during the same period was 45,138,420 net tons, or 3.99 per cent of the total amount of freight carried. The total number tons of freight carried by rail in 1906 was 1,610,099,839 tons. The total number tons of freight carried on the Great Lakes during this same period was 75,610,690 net tons, or 4.95 per cent of the total amount of freight carried.

The number of clearances made in 1902 (first year available) was 80,879; the number of tons involved was 74,807,718. The number of clearances made in 1907 was 7,769; the number of tons involved was 99,066,409. (These data were obtained from the Monthly Summary of Commerce and Finance of the United States, December, 1904, p. 2055; 1907, p. 1175.) This shows a decrease of 7,110 in the number of clearances, with an increase of 24,358,691 net registered tons in the number of tons involved.

TABLE 1. SHOWING THE NUMBER AND NET TONNAGE OF THE VESSELS BUILT EACH YEAR ON THE GREAT LAKES, 1888-1907.

| Year | Number of Vessels | Net Tons | Average Tonnage |
|---|---|---|---|
| 1888 | 222 | 101,103 | 455 |
| 1889 | 225 | 107,080 | 476 |
| 1890 | 191 | 108,526 | 568 |
| 1891 | 204 | 111,856 | 548 |
| 1892 | 169 | 45,969 | 272 |
| 1893 | 175 | 99,271 | 567 |
| 1894 | 106 | 41,985 | 396 |
| 1895 | 93 | 36,353 | 391 |
| 1896 | 117 | 108,782 | 929 |
| 1897 | 120 | 116,937 | 974 |
| 1898 | 87 | 54,084 | 622 |
| 1899 | 122 | 80,366 | 658 |
| 1900 | 125 | 130,611 | 1,045 |
| 1901 | 175 | 169,085 | 966 |
| 1902 | 133 | 168,873 | 1,269 |
| 1903 | 123 | 136,844 | 1,112 |
| 1904 | 119 | 159,433 | 1,339 |
| 1905 | 101 | 93,123 | 922 |
| 1906 | 204 | 265,271 | 1,300 |
| 1907 | 117 | 244,291 | 2,088 |

NOTE—This table with the exception of the figure on the average tonnage is a copy of a section of table No. 139, found in the Report of the Bureau of Statistics (Statistical Abstract of the United States p. 242).

In compiling these tables the Bureau of Statistics relied upon the Reports of the Bureau of Navigation, Department of Commerce and Labor.

TABLE 2. CLASSIFICATION OF VESSELS CONSTRUCTED ON THE GREAT LAKES ACCORDING TO LENGTH OF KEEL, 1896-1906.

This table includes only such schooners, steamers, (freight and passenger) and barges, as are used in carrying the Lake Commerce. This excludes dredges, mud scows, launches, house, canal, and fire boats, pile drivers, steam, sail and gasoline yachts and steam tugs.

| Year | Length of Keel in Feet | | | | | | No of Vessels |
|---|---|---|---|---|---|---|---|
| | 1-100 | 100-200 | 200-300 | 300-400 | 400-500 | 500-600 | |
| 1896 | 16 | 8 | 5 | 18 | 12 | .... | 59 |
| 1897 | 24 | 6 | 7 | 8 | 4 | .... | 49 |
| 1898 | 37 | 9 | 5 | 6 | 9 | .... | 66 |
| 1899 | 27 | 5 | 5 | 3 | 11 | .... | 51 |
| 1900 | 17 | 6 | 7 | 1 | 18 | .... | 49 |
| 1901 | 37 | 13 | 4 | 20 | 10 | .... | 84 |
| 1902 | 17 | 7 | 3 | 27 | 9 | .... | 63 |
| 1903 | 21 | 5 | 14 | 18 | 19 | .... | 77 |
| 1904 | 9 | 3 | 4 | 3 | 5 | 1 | 25 |
| 1905 | 16 | 8 | 3 | 5 | 8 | 17 | 57 |
| 1906 | 16 | 7 | 7 | 4 | 13 | 45 | 92 |
| Total | 237 | 77 | 64 | 113 | 118 | 63 | 672 |

NOTE—The data for this table were compiled from the Classification of "American Steam and Sail Vessels of the Great Lakes," found in the Blue Book of American Shipping (1907, pp. 149 et seq.).

TABLE 3. DOMESTIC ARRIVALS AND CLEARANCES OF VESSELS ON THE GREAT LAKES, 1902-1907.

It is the purpose of this table to show the total number of arrivals and clearances made at the Lake ports, and the aggregate net ton capacity of the vessels which arrived and cleared at these ports. The aggregate net ton capacity has to be distinguished from the amount of freight actually carried.

| | Arrivals | | Clearances | |
|---|---|---|---|---|
| Year | Number of Vessels | Net Tons | Number of Vessels | Net Tons |
| 1902 | 80,748 | 74,609,251 | 80,879 | 74,807,718 |
| 1903 | 78,473 | 74,174,351 | 78,343 | 73,924,017 |
| 1904 | 68,625 | 67,444,217 | 68,569 | 67,401,793 |
| 1905 | 79,229 | 87,574,689 | 79,472 | 87,424,815 |
| 1906 | 75,968 | 94,063,525 | 76,097 | 94,094,316 |
| 1907 | 74,135 | 99,695,453 | 73,769 | 99,166,409 |

NOTE—These data were gathered from the Monthly Summary of Commerce and Finance of the United States, Department of Commerce and Labor (1902; 1904, p. 2055; 1907, p. 1775).

TABLE 4. NUMBER AND GROSS TONNAGE OF SAILING VESSELS, STEAM VESSELS, CANAL BOATS AND BARGES DOCUMENTED ON THE NORTHERN LAKES FROM 1868 TO 1906.

| Year | Sailing | | Steam | | Canal Boats | | Barges | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Tons | No. | Tons | No. | Tons | No. | Tons | No. | Tons |
| 1868 | 1,855 | 298,978 | 694 | 144,117 | 2,849 | 241,888 | 64 | 18,986 | 5,462 | 699,974 |
| 1873 | 1,663 | 296,008 | 908 | 180,280 | 2,984 | 297,601 | 177 | 49,889 | 5,976 | 783,418 |
| 1878 | 1,546 | 315,908 | 918 | 201,880 | 819 | 41,909 | 188 | 48,296 | 3,186 | 604,696 |
| 1883 | 1,373 | 310,454 | 1,149 | 304,941 | 736 | 69,941 | 196 | 48,878 | 3,403 | 733,911 |
| 1888 | 1,277 | 314,765 | 1,348 | 450,128 | 896 | 61,026 | 44 | 18,194 | 3,990 | 874,113 |
| 1893 | 1,205 | 317,789 | 1,731 | 696,702 | 748 | 76,844 | 88 | 97,788 | 3,761 | 1,188,067 |
| 1898 | 960 | 333,704 | 1,764 | 998,644 | 884 | 40,486 | 148 | 69,696 | 3,894 | 1,487,530 |
| 1903 | 676 | 315,195 | 1,796 | 1,467,998 | 458 | 47,760 | 185 | 71,761 | 3,110 | 1,902,694 |
| 1906 | 519 | 269,126 | 1,844 | 1,841,458 | 480 | 50,890 | 209 | 78,289 | 3,052 | 2,284,468 |

NOTE 1—Northern Lakes includes the Great Lakes and the Minor Lakes and Canals in Michigan, Wisconsin, Minnesota and New York.

NOTE 2—This Table was taken from the Report of the Commissioner of Navigation 1906, Page 221.

NOTE 3—Documented—Registered Enrolled and licensed Vessels.

TABLE 5. NUMBER OF PASSENGERS CARRIED ON THE GREAT LAKES FROM THE MOST IMPORTANT PORTS, 1886-1906. REPORTS OF FEDERAL VESSEL INSPECTOR, 1886-1906.

| | Chicago | Milwaukee | Duluth | Detroit | Toledo | Cleveland | Buffalo |
|---|---|---|---|---|---|---|---|
| 1886 | 228,366 | 140,765 | 202,803 | 3,127,445 | ..... | 317,621 | 338,308 |
| 1887 | 159,968 | 192,416 | 179,354 | 2,795,653 | ..... | 588,949 | 318,137 |
| 1888 | 84,672 | 148,672 | 195,662 | 2,968,537 | ..... | 538,517 | 373,721 |
| 1889 | 240,490 | 153,517 | 115,153 | 3,153,844 | ..... | 631,272 | 408,891 |
| 1890 | 532,756 | 208,929 | 192,332 | 4,959,965 | ..... | 667,091 | 465,296 |
| 1891 | 429,144 | 180,434 | 249,620 | 5,246,311 | ..... | 504,983 | 622,267 |
| 1892 | 321,322 | 171,179 | 339,569 | 5,200,850 | ..... | 755,177 | 994,137 |
| 1893 | 2,290,830 | 214,492 | 440,633 | 5,263,357 | ..... | 720,918 | 816,479 |
| 1894 | 289,169 | 269,332 | 668,621 | 5,098,485 | ..... | 788,869 | 937,982 |
| 1895 | 543,142 | 544,172 | 732,837 | 5,101,211 | ..... | 1,026,011 | 1,061,789 |
| 1896 | 530,881 | 292,705 | 806,223 | 4,987,990 | ..... | 725,978 | 681,925 |
| 1897 | 500,288 | 317,425 | 607,071 | 5,303,119 | ..... | 690,539 | 495,168 |
| 1898 | 250,689 | 340,048 | 458,913 | 5,506,865 | ..... | 896,933 | 515,302 |
| 1899 | 325,514 | 391,971 | 690,472 | 6,019,026 | ..... | 1,068,859 | 826,431 |
| 1900 | 443,660 | 356,049 | 650,487 | 6,274,837 | 354,225 | 876,050 | 796,040 |
| 1901 | 487,442 | 400,438 | 1,179,549 | 6,179,893 | 530,074 | 298,750 | 1,390,945 |
| 1902 | 490,514 | 285,774 | 1,103,808 | 6,690,630 | 642,132 | 107,620 | 760,044 |
| 1903 | 592,659 | 275,706 | 983,888 | 7,219,886 | 696,772 | 105,159 | 561,063 |
| 1904 | 784,265 | 343,717 | 986,751 | 7,297,241 | 733,126 | 101,693 | 492,258 |
| 1905 | 1,210,837 | 451,010 | 655,677 | 6,795,439 | 1,288,520 | 955,770 | 887,983 |
| 1906 | 1,818,194 | 484,691 | 1,051,074 | 7,403,154 | 1,565,056 | 905,340 | 895,549 |

Number of passengers carried out of Chicago by boat in 1907 was 1,967,994.

Number of passengers reported at Chicago to Sept. 1st, '08, 1,676,524.

[1]These statistics are given as published in the reports of the federal vessel inspector, being the only statistics available on the subject. It should be said in explanation, however, that the method of reporting to the vessel inspector is such as to make the figures of passenger traffic for each port somewhat misleading.

[illegible] MERCHANT MARINE—CONSTRUCTION [illegible] THE YEARS OF 1905 AND 1906.

| [illegible] | 1905 | | 1906 | |
|---|---|---|---|---|
| | Number | Gross Tons | Number | Gross Tons |
| Atlantic and Gulf Coasts | [illegible] | [illegible] | [illegible] | 136,622 |
| Pacific Coast | [illegible] | 20,135 | [illegible] | 20,[illegible] |
| Northern Lakes | [illegible] | 98,133 | [illegible] | 205,271 |
| Western Rivers | [illegible] | 6,677 | [illegible] | 6,[illegible] |
| Total | 1,[illegible] | 230,216 | 1,221 | 418,745 |

NOTE—[illegible] Including 6 Vessels, 64 tons built in Porto Rico.
[illegible] Including 2 Vessels, 15 tons, built in Porto Rico.

This is a section of table on the Comparision of Merchant Marine. Report of Bureau of Navigation p 19, 1906.

TABLE 7. COMPARISON OF MERCHANT MARINE OF 1905 AND 1906.

| Geographical Distribution | 1905 | | 1906 | |
|---|---|---|---|---|
| | Number | Gross Tons | Number | Gross Tons |
| Atlantic and Gulf Coasts | 17,357 | 3,396,462 | 17,477 | 3,427,046 |
| Porto Rico | 57 | 1,915 | 59 | 5,499 |
| Pacific Coast | 2,674 | 793,068 | 2,787 | 817,572 |
| Hawaiian Islands | 56 | 28,622 | 49 | 22,463 |
| Northern Lakes | 3,011 | 2,062,147 | 3,052 | 3,234,432 |
| Western Rivers | 1,526 | 174,319 | 1,582 | 167,957 |
| Total | 24,681 | 6,456,543 | 25,006 | 6,674,969 |

NOTE—On June 30, 1906, the Merchant Marine of the United States, including ALL KINDS of DOCUMENTED SHIPPING, comprised 25,006 vessels, of 6,674,969 gross tons. The Northern Lakes on this date, including ALL KINDS of DOCUMENTED SHIPPING, comprised 3,052 vessels of 3,234,432 gross tons. From this it is easily deducted that the number of vessels on the Northern Lakes is about one-eighth of the Merchant Marine of the United States, with a tonnage of practically one-half of the entire tonnage of said Merchant Marine.

NOTE—This table is a section of the table showing a comparison of the Merchant Marine of 1905 and 1906. Report of the Commissioner of Navigation (p. 11, 1906.)

# Tables Showing Receipts and Shipments at Chicago River and Harbor, Calumet River and Harbor and the Grand Total for the Port of Chicago, 1886-1907, Both Inclusive.

The table of weights authorized by the Chicago Board of Trade is used in reducing the different quantities found in the following tables to tons of 2,000 pounds weight.

The item of Unclassified Merchandise was transcribed from the figures supplied by Mr. John C. Ames, Collector of Customs for the District of Chicago, and the annual reports of the U. S. Army Engineer for the District of Chicago.

The item of Classified Merchandise includes the following: Salt, groceries, fish, boots and shoes, sugar, flour, potatoes, cheese, coffee, green fruits, hides and leather, wool and hair, malt, meats and meat products, mill stuffs, oil, oil cake, glucose, etc.

The item of Ore and Ore Products includes iron ore, manufactured iron, nails and hardware, steel rails, copper, sulphur, etc.

The item of Coal includes both hard and soft coal.

The item of Building Material includes lumber, shingles, lath, posts, railroad ties, poles, wood in cord, plaster, cement, asphalt, etc.

The item of Grain includes wheat, rye, oats, corn, barley, flaxseed, etc.

Tabe 1—Coastwise receipts in tons, Chicago river and harbor only.

Table 2—Coastwise shipments in tons, Chicago river and harbor only.

Table 3—Coastwise receipts in tons, Calumet river and harbor only.

Table 4—Coastwise shipments in tons, Calumet river and harbor only.

Table 5—Coastwise receipts and shipments at Chicago river and harbor, Calumet river and harbor and grand total for the Port of Chicago.

TABLE 1. CHICAGO RIVER AND HARBOR ONLY, 1886-1907. BOTH INCLUSIVE.
COASTWISE RECEIPTS IN TONS.

| | Unclassified Merchandise | Classified Merchandise | Ore and Ore Products | Coal | Grain | Building Material | Total | ‡ Grain |
|---|---|---|---|---|---|---|---|---|
| | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Bushels |
| *1886 | 490,500 | 158,762 | 454,010 | 890,326 | 877 | 3,405,836 | 5,400,311 | 29,220 |
| *1887 | 624,600 | 185,306 | 533,200 | 941,847 | 3,485 | 3,437,184 | 5,525,622 | 116,160 |
| *1888 | 634,200 | 170,046 | 152,660 | 1,247,845 | 1,803 | 3,571,426 | 5,804,980 | 60,100 |
| *1889 | 537,600 | 193,872 | 128,835 | 1,230,030 | 429 | 3,312,908 | 5,403,669 | 128,745 |
| 1890 | 289,772 | 128,088 | 126,145 | 1,823,821 | ..... | 2,973,247 | 4,685,767 | 179,810 |
| 1891 | 281,956 | 141,155 | 90,871 | 1,246,106 | ..... | 2,785,250 | 4,545,338 | ..... |
| 1892 | 500,000 | 227,775 | 137,411 | 1,363,862 | 2,522 | 3,044,518 | 5,276,088 | 94,500 |
| 1893 | 618,325 | 218,113 | 48,872 | 1,346,274 | 5,121 | 2,751,785 | 4,973,490 | 170,100 |
| 1894 | 828,249 | 295,005 | 61,321 | 1,210,198 | 21,742 | 2,485,072 | 4,901,587 | 776,500 |
| 1895 | 805,948 | 320,775 | 69,791 | 1,129,302 | 43,612 | 2,632,602 | 5,002,030 | 1,451,510 |
| *1896 | 396,600 | 469,918 | 99,694 | 1,146,365 | 3,534 | 1,777,956 | 3,894,369 | 127,260 |
| 1897 | 311,057 | 415,335 | 104,876 | 1,044,224 | 109,670 | 2,118,415 | 4,103,577 | 3,669,940 |
| 1898 | 316,100 | 424,908 | 84,015 | 1,231,851 | 48,982 | 1,717,611 | 3,823,417† | 1,859,850 |
| 1899 | 390,426 | 476,270 | 98,805 | 1,038,251 | 33,724 | 1,836,706 | 3,874,250 | 1,146,470 |
| 1900 | 259,372 | 466,725 | 61,274 | 856,599 | 10,899 | 1,515,532 | 3,170,101 | 359,300 |
| 1901 | 616,535 | 937,135 | 101,355 | 877,240 | 15,453 | 1,691,206 | 4,238,924 | 515,100 |
| 1902 | 618,995 | 1,003,340 | 89,689 | 262,843 | 54,647 | 1,583,924 | 3,613,438 | 1,821,568 |
| 1903 | 630,553 | 738,347 | 144,988 | 985,153 | 112,822 | 1,216,413 | 3,828,206 | 3,255,200 |
| 1904 | 451,729 | 717,165 | 43,912 | 762,671 | 29,358 | 966,560 | 2,981,424 | 978,600 |
| 1905 | 753,289 | 731,527 | 113,721 | 777,892 | 50,094 | 1,017,824 | 3,444,147 | 1,761,696 |
| 1906 | 696,995 | 537,822 | 203,254 | 627,175 | 21,152 | 1,024,406 | 3,110,804 | 731,415 |
| 1907 | 694,070 | 347,265 | 142,076 | 866,051 | 9,826 | 947,785 | 3,007,074 | 350,938 |

* The figures for the years 1886, 1887, 1888, 1889 and 1896 were taken from the data supplied by Mr. John C. Ames, Collector of Customs for the District of Chicago. The figures for the other years were taken from the annual reports of the United States Army Engineer for the District of Chicago.

† This figure in the Engineers report is 3,823,217.

‡ Taken from the Report of the Collector of Customs.

TABLE 2. CHICAGO RIVER AND HARBOR ONLY, 1886-1907. BOTH INCLUSIVE.
COASTWISE SHIPMENTS IN TONS.

| | Unclassified Merchandise | Classified Merchandise | Grain | Coal | Ore and Ore Products | Total | Grain Shipped to Foreign Ports | Grain |
|---|---|---|---|---|---|---|---|---|
| | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Bushels |
| *1886 | 123,000 | 198,214 | 1,559,068 | ..... | 12,107 | 1,892,389 | 269,417 | 56,299,358 |
| *1887 | 135,000 | 198,241 | 1,299,924 | ..... | 23,275 | 1,656,440 | 254,654 | 66,812,037 |
| *1888 | 151,000 | 226,143 | 1,724,274 | ..... | 13,952 | 2,115,369 | 238,042 | 63,070,160 |
| *1889 | 202,000 | 286,815 | 5,560,635 | ..... | 33,586 | 5,900,891 | 346,815 | 95,212,106 |
| 1890 | 102,000 | 269,952 | 2,115,660 | ..... | 36,145 | 2,523,757 | 298,547 | 83,260,510 |
| 1891 | 136,566 | 232,662 | 2,226,094 | ..... | 74,105 | 2,669,427 | 199,789 | 96,983,084 |
| 1892 | 170,707 | 339,275 | 2,542,216 | 4,467 | 80,239 | 3,136,904 | 224,409 | 96,802,958 |
| 1893 | 258,265 | 216,353 | 2,400,684 | 4,749 | 105,422 | 2,985,473 | 346,729 | 92,703,766 |
| 1894 | 145,308 | 332,896 | 1,720,736 | 4,621 | 103,788 | 2,307,649 | 117,031 | 59,440,840 |
| 1895 | 285,523 | 144,479 | 1,733,398 | 6,176 | 34,336 | 2,203,912 | 113,712 | 66,266,176 |
| *1896 | 178,000 | 470,930 | 2,039,756 | ..... | 115,973 | 2,804,659 | 249,092 | 76,966,667 |
| 1897 | 225,058 | 258,304 | 2,430,135 | 631 | 132,054 | 3,046,182 | 343,490 | 109,658,909 |
| 1898 | 303,776 | 210,012 | 2,935,165 | 2,782 | 116,502 | 3,568,237 | 930,255 | 111,899,285 |
| 1899 | 231,002 | 226,031 | 1,690,441 | 853 | 76,787 | 2,215,114** | 491,093 | 66,478,155 |
| 1900 | 202,695 | 360,952 | 2,094,265 | ..... | 45,057 | 2,702,969 | 570,083 | 80,971,370 |
| 1901 | 310,133 | 329,169 | 1,262,616 | ..... | 43,400 | 1,945,318 | 433,339 | 47,807,542 |
| 1902 | 395,925 | 342,735 | 856,456 | ..... | 6,490 | 1,601,606 | 387,575 | 31,618,020 |
| 1903 | 369,814 | 422,269 | 1,482,351 | ..... | 2,914 | 2,277,348 | 608,396 | 57,561,433 |
| 1904 | 315,335 | 250,685 | 896,287 | ..... | 2,340 | 1,464,647 | 279,011 | 32,389,401 |
| 1905 | 359,146 | 424,131 | 1,160,762 | ..... | ..... | 1,944,839 | 412,272 | 45,104,634 |
| 1906 | 353,762 | 453,654 | 1,093,566 | ..... | ..... | 1,900,982 | 352,938 | 40,988,345 |
| 1907 | 389,394 | 442,129 | 1,141,523 | ..... | ..... | 1,973,049 | 376,992 | 40,978,375 |

* The figures for the years 1886, 1887, 1888, 1889, 1896 were taken from the data supplied by Mr. John C. Ames, Collector of Customs for the District of Chicago. The figures for the remaining years were taken from the annual reports of the United States Army Engineer for the District of Chicago. The figures in the last column for grain are from the report of the Collector of Customs.

** This figure in the Engineers report is 2,315,114.

TABLE 3. CALUMET RIVER AND HARBOR ONLY, 1886-1907. BOTH INCLUSIVE.
COASTWISE RECEIPTS IN TONS.

| | Unclassified Merchandise | Classified Merchandise | Grain | Coal | Ore and Ore Products | Building Material | Total | † Grain |
|---|---|---|---|---|---|---|---|---|
| | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Bushels |
| *1886 | 500 | 35,838 | ..... | 43,469 | 317,412 | 85,831 | 483,070 | ..... |
| *1887 | 450 | 67,944 | ..... | 41,202 | 349,360 | 110,558 | 569,514 | ..... |
| *1888 | 1,600 | 54,665 | ..... | 88,575 | 279,710 | 55,967 | 480,517 | ..... |
| *1889 | 1,900 | 34,294 | ..... | 99,335 | 562,115 | 58,157 | 756,496 | ..... |
| 1890 | 20,736 | 42,390 | ..... | 98,000 | 703,149 | 911,800 | 1,776,075 | ..... |
| 1891 | 41,251 | 54,216 | ..... | 113,880 | 977,626 | 823,091 | 2,010,064 | ..... |
| 1892 | 50,000 | 79,906 | ..... | 123,000 | 1,334,433 | 147,157 | 1,734,496 | ..... |
| 1893 | 50,000 | 56,445 | ..... | 117,602 | 350,725 | 112,906 | 687,678 | ..... |
| 1894 | 50,000 | 87,059 | ..... | 94,353 | 861,178 | 113,674 | 1,206,294 | ..... |
| 1895 | 50,000 | 173,786 | ..... | 139,262 | 1,856,700 | 160,060 | 2,379,808 | ..... |
| *1896 | 2,150 | 119,628 | ..... | 213,935 | 1,212,905 | 194,736 | 1,743,350 | ..... |
| 1897 | 5,109 | 151,253 | 15,406 | 257,064 | 1,734,096 | 200,019 | 2,362,947 | 539,060 |
| 1898 | 4,737 | 169,183 | ..... | 310,800 | 2,273,467 | 439,015 | 3,197,202 | ..... |
| 1899 | 3,174 | 169,633 | 19,614 | 296,524 | 2,208,267 | 139,396 | 2,831,598 | 660,000 |
| 1900 | 6,774 | 177,803 | 10,290 | 126,795 | 2,333,351 | 115,920 | 2,773,063 | 343,000 |
| 1901 | 2,315 | 193,950 | 7,200 | 185,165 | 2,660,055 | 203,719 | 3,252,404 | 240,000 |
| 1902 | 9,900 | 178,535 | 53,133 | 36,669 | 3,334,841 | 192,305 | 3,805,383 | 1,771,119 |
| 1903 | 11,412 | 45,379 | 27,445 | 265,482 | 3,129,100 | 145,961 | 3,624,782 | 955,600 |
| 1904 | 1,860 | 18,505 | 31,020 | 262,182 | 2,558,440 | 110,315 | 2,982,322 | 959,000 |
| 1905 | 19,036 | 42,675 | 23,175 | 260,813 | 3,213,626 | 175,642 | 3,734,967 | 780,500 |
| 1906 | 6,094 | 28,300 | 12,150 | 287,396 | 4,065,121 | 126,607 | 4,545,668 | 405,000 |
| 1907 | 3,713 | 35,107 | 23,360 | 642,440 | 4,719,914 | 133,146 | 5,557,680 | 794,000 |

* The figures for the years 1886, 1887, 1888, 1889 and 1896 were taken from the data supplied by Mr. John C. Ames, Collector of Customs for the District of Chicago. The figures for the remaining years were taken from the annual reports of the United States Army Engineer for the District of Chicago.

† Taken from the Report of the Collector of Customs.

TABLE 4. CALUMET RIVER AND HARBOR ONLY, 1886-1907. BOTH INCLUSIVE.
COASTWISE SHIPMENTS IN TONS.

| | Unclassified Merchandise | lassified rchandise | Grain | Coal | Ore and Ore Products | Total | ‡ Grain |
|---|---|---|---|---|---|---|---|
| | Tons | Tons | Tons | Tons | Tons | Tons | Bushels |
| *1886 | 21 | ..... | 17,604 | ..... | 40 | 17,665 | 705,391 |
| *1887 | ..... | ..... | 18,757 | ..... | ..... | 18,757 | 634,331 |
| *1888 | 300 | ..... | 9,075 | ..... | 1,930 | 11,305 | 302,500 |
| *1889 | ..... | ..... | 4,456 | ..... | ..... | 4,456 | 158,000 |
| 1890 | ..... | ..... | 20,326 | ..... | ..... | 20,326 | 733,458 |
| 1891 | ..... | ..... | 54,815 | ..... | 1,872 | 56,687 | 2,252,465 |
| 1892 | ..... | ..... | 82,411 | 500 | 5,500 | 88,411 | 3,393,115 |
| 1893 | ..... | ..... | 213,382 | 100 | 2,237 | 215,719 | 9,116,439 |
| 1894 | 1,500 | ..... | 203,713 | ..... | 25,390 | 230,603 | 8,499,370 |
| 1895 | 5,226 | 25,749 | 376,264 | 6,575 | 64,128 | 477,942 | 15,881,585 |
| 1896 | 21,515 | 32,738 | 904,485 | ..... | 116,456 | 1,075,194 | 38,139,287 |
| 1897 | 14,839 | 44,161 | 995,820 | 7,815 | 68,546 | 1,131,181† | 45,334,490 |
| 1898 | 10,826 | 10,991 | 683,369 | 23,250 | 191,888 | 920,324 | 27,790,515 |
| 1899 | 5,685 | 47,018 | 310,534 | 3,355 | 31,684 | 398,276 | 12,204,090 |
| 1900 | 3,295 | 35,016 | 970,995 | 1,850 | 1,555 | 1,012,711 | 36,823,180 |
| 1901 | 20,020 | 31,005 | 678,808 | ..... | 13,040 | 742,873 | 25,527,960 |
| 1902 | 37,600 | 73,457 | 516,620 | ..... | 21,368 | 649,045 | 19,448,625 |
| 1903 | 30,996 | 54,804 | 1,022,003 | ..... | 9,640 | 1,117,443 | 39,209,555 |
| 1904 | 61,409 | 59,031 | 606,850 | ..... | 18,649 | 745,939 | 20,910,536 |
| 1905 | 85,883 | 89,303 | 620,241 | ..... | ..... | 795,427 | 23,339,693 |
| 1906 | 63,217 | 143,591 | 537,860 | ..... | ..... | 744,668 | 19,584,161 |
| 1907 | 53,292 | 132,551 | 686,824 | ..... | ..... | 872,667 | 25,043,286 |

* The figures for the years 1886, 1887, 1888, 1889 and 1896 were taken from the data supplied by Mr. John C. Ames, Collector of Customs for the District of Chicago. The figures for the remaining years were taken from the annual reports of the United States Army Engineer for the District of Chicago.

† This figure in the Engineer's report is 1,130,281.

‡ Taken from the Report of the Collector of Customs.

TABLE 5.

TOTAL RECEIPTS AND SHIPMENTS AT CHICAGO RIVER AND HARBOR, CALUMET RIVER AND HARBOR AND FOR THE PORT OF CHICAGO, 1886-1907, BOTH INCLUSIVE.

| | Receipts Chicago River and Har. | Shipments Chicago River and Har. | Receipts Cal. River and Har. | Shipments Cal. River and Har. | Receipts and Shipments Chicago River and Har. | Receipts and Shipments Cal. River and Har. | Receipts and Ship'ts Port of Chicago |
|---|---|---|---|---|---|---|---|
| | Tons | Tons | Tons | Tons | Tons | Tons | Tons |
| 1886 | 5,400,311 | 1,892,389 | 483,070 | 17,685 | 7,292,700 | 500,755 | 7,793,455 |
| 1887 | 5,525,622 | 1,656,440 | 569,514 | 18,757 | 7,182,062 | 588,271 | 7,770,333 |
| 1888 | 5,804,980 | 2,115,369 | 480,517 | 11,305 | 7,920,349 | 491,822 | 8,412,171 |
| 1889 | 5,098,145 | 5,900,891 | 756,496 | 4,456 | 10,994,036 | 760,952 | 11,754,988 |
| 1890 | 4,695,757 | 2,523,757 | 1,776,075 | 20,226 | 7,209,514 | 1,796,401 | 9,005,915 |
| 1891 | 4,545,338 | 2,669,427 | 2,010,084 | 56,697 | 7,214,765 | 2,066,781 | 9,281,546 |
| 1892 | 5,276,088 | 3,136,904 | 1,784,496 | 88,411 | 8,412,992 | 1,872,907 | 10,285,899 |
| 1893 | 4,973,490 | 2,965,473 | 657,678 | 215,719 | 7,938,963 | 903,397 | 8,842,360 |
| 1894 | 4,901,587 | 2,307,649 | 1,206,294 | 230,608 | 7,209,236 | 1,436,897 | 8,646,133 |
| 1895 | 5,002,080 | 2,203,912 | 2,379,806 | 477,942 | 7,205,942 | 2,857,750 | 10,063,692 |
| 1896 | 3,894,369 | 2,804,659 | 1,743,350 | 1,075,194 | 6,699,918 | 2,818,544 | 9,517,972 |
| 1897 | 4,108,577 | 3,046,182 | 2,362,937 | 1,131,181‡ | 7,149,759 | 3,494,118 | 10,643,877 |
| 1898 | 3,823,417* | 3,568,287 | 3,197,202 | 920,324 | 7,391,704 | 4,117,526 | 11,509,230 |
| 1899 | 3,874,250 | 2,215,114† | 2,831,596 | 296,276 | 6,089,364 | 3,129,874 | 12,219,238 |
| 1900 | 3,170,101 | 2,702,969 | 2,773,963 | 1,012,711 | 5,873,070 | 3,786,674 | 9,659,744 |
| 1901 | 4,238,924 | 1,945,818 | 3,252,404 | 742,873 | 6,184,242 | 3,995,277 | 10,179,519 |
| 1902 | 3,613,438 | 1,601,606 | 3,305,383 | 649,045 | 5,215,044 | 4,454,428 | 9,669,472 |
| 1903 | 3,828,206 | 2,277,348 | 3,624,782 | 1,117,443 | 6,105,554 | 4,742,225 | 10,847,779 |
| 1904 | 2,961,424 | 1,464,647 | 2,962,322 | 745,930 | 4,446,071 | 3,728,261 | 8,174,332 |
| 1905 | 3,444,147 | 1,944,839 | 3,734,967 | 706,427 | 5,388,986 | 4,530,394 | 9,919,380 |
| 1906 | 3,110,804 | 1,900,962 | 4,545,658 | 744,668 | 5,011,766 | 5,290,326 | 10,302,112 |
| 1907 | 3,007,074 | 1,973,049 | 5,557,680 | 872,667 | 4,980,123 | 6,430,347 | 11,410,470 |

* Figure 3,823,417 is 3,823,217 in the Engineer's Report 1898.
† Figure 2,215,114 is 2,315,114 in the Engineer's Report 1899.
‡ Figure 1,131,181 is 1,130,281 in the Engineer's Report 1897.
** The figures for the years 1886, 1887, 1888, 1889 and 1896 were taken from the data supplied by Mr. John C. Ames, Collector of Customs for the District of Chicago. The figures for the remaining years were taken from the annual reports of the United States Army Engineer for the District of Chicago.

## Tables Showing Receipts and Shipments of Various Commodities at Lake Ports, 1901 to 1907; Receipts and Shipments of Principal Commodities by Lake and Rail at Chicago-South Chicago and Milwaukee; Comparative Receipts and Shipments of Designated Commodities by Lake and Rail for Chicago-South Chicago; Comparative Freight Tonnages by Water of Designated Harbors; Increase or Decrease of Water Commerce in Commodities Named for Designated Ports, 1907 compared with 1901.

For detailed reference to tables, see Tables of Contents. When not otherwise indicated on the table, the figures are taken from the Monthly Summary of Commerce and Finance of the United States, Bureau of Statistics, Department of Commerce and Labor.

TABLE 4. NUMBER AND GROSS TONNAGE OF SAILING VESSELS, STEAM VESSELS, CANAL BOATS AND BARGES DOCUMENTED ON THE NORTHERN LAKES FROM 1868 TO 1906.

| Year | Sailing | | Steam | | Canal Boats | | Barges | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Tons | No. | Tons | No. | Tons | No. | Tons | No. | Tons |
| 1868 | 1,855 | 293,978 | 624 | 144,117 | 2,822 | 241,553 | 64 | 15,956 | 5,365 | 695,604 |
| 1873 | 1,663 | 298,002 | 802 | 180,250 | 2,934 | 267,601 | 177 | 42,559 | 5,576 | 788,412 |
| 1878 | 1,546 | 315,908 | 918 | 201,550 | 519 | 41,902 | 123 | 45,296 | 3,106 | 604,656 |
| 1883 | 1,373 | 310,454 | 1,149 | 304,641 | 725 | 65,241 | 156 | 43,575 | 3,403 | 723,911 |
| 1888 | 1,277 | 314,765 | 1,342 | 480,138 | 598 | 61,005 | 44 | 18,194 | 3,290 | 874,102 |
| 1896 | 1,205 | 317,789 | 1,731 | 828,702 | 743 | 76,844 | 82 | 37,732 | 3,761 | 1,261,067 |
| 1898 | 960 | 333,704 | 1,764 | 998,644 | 334 | 40,456 | 148 | 69,696 | 3,256 | 1,437,500 |
| 1903 | 676 | 315,195 | 1,796 | 1,467,992 | 453 | 47,750 | 185 | 71,761 | 3,110 | 1,902,698 |
| 1906 | 519 | 269,136 | 1,844 | 1,841,438 | 480 | 50,599 | 209 | 73,259 | 3,052 | 2,234,432 |

NOTE 1—Northern Lakes includes the Great Lakes and the Minor Lakes and Canals in Michigan, Wisconsin, Minnesota and New York.

NOTE 2—This Table was taken from the Report of the Commissioner of Navigation 1906, Page 261.

NOTE 3—Documented—Registered Enrolled and licensed Vessels.

TABLE 5. NUMBER OF PASSENGERS CARRIED ON THE GREAT LAKES FROM THE MOST IMPORTANT PORTS, 1886-1906. REPORTS OF FEDERAL VESSEL INSPECTOR, 1886-1906.

| | Chicago | Milwaukee | Duluth | Detroit | Toledo | Cleveland | Buffalo |
|---|---|---|---|---|---|---|---|
| 1886 | 228,366 | 140,765 | 202,803 | 3,127,445 | ..... | 317,621 | 338,308 |
| 1887 | 159,968 | 192,416 | 179,354 | 2,795,653 | ..... | 588,949 | 318,137 |
| 1888 | 84,672 | 148,672 | 195,662 | 2,968,537 | ..... | 538,517 | 373,721 |
| 1889 | 240,480 | 153,517 | 115,153 | 3,153,844 | ..... | 631,272 | 408,891 |
| 1890 | 532,756 | 208,929 | 192,332 | 4,959,965 | ..... | 667,091 | 465,296 |
| 1891 | 429,144 | 180,434 | 249,620 | 5,246,311 | ..... | 504,983 | 622,267 |
| 1892 | 321,322 | 171,179 | 339,569 | 5,200,850 | ..... | 755,177 | 994,137 |
| 1893 | 2,290,830 | 214,492 | 440,633 | 5,263,357 | ..... | 720,918 | 816,479 |
| 1894 | 289,169 | 269,332 | 668,621 | 5,098,485 | ..... | 788,869 | 937,982 |
| 1895 | 543,142 | 544,172 | 732,837 | 5,101,211 | ..... | 1,026,011 | 1,061,789 |
| 1896 | 530,881 | 292,705 | 806,223 | 4,967,990 | ..... | 725,978 | 681,925 |
| 1897 | 500,238 | 317,425 | 607,071 | 5,303,119 | ..... | 690,539 | 495,168 |
| 1898 | 250,689 | 340,048 | 458,913 | 5,506,865 | ..... | 896,933 | 515,302 |
| 1899 | 325,514 | 391,971 | 690,472 | 6,019,026 | ..... | 1,068,859 | 826,431 |
| 1900 | 443,660 | 356,049 | 650,487 | 6,274,837 | 354,225 | 876,050 | 796,040 |
| 1901 | 487,442 | 400,438 | 1,179,549 | 6,179,893 | 530,074 | 298,750 | 1,390,945 |
| 1902 | 480,514 | 285,774 | 1,103,808 | 6,690,630 | 642,132 | 107,620 | 760,044 |
| 1903 | 592,659 | 275,705 | 983,888 | 7,219,886 | 695,772 | 105,159 | 561,063 |
| 1904 | 784,265 | 343,717 | 986,751 | 7,297,241 | 733,126 | 101,693 | 492,258 |
| 1905 | 1,210,837 | 451,010 | 655,677 | 6,795,439 | 1,288,520 | 955,770 | 887,983 |
| 1906 | 1,818,194 | 484,691 | 1,051,074 | 7,408,154 | 1,565,056 | 805,340 | 895,549 |

Number of passengers carried out of Chicago by boat in 1907 was 1,967,994.

Number of passengers reported at Chicago to Sept. 1st, '08, 1,676,524.

[1]These statistics are given as published in the reports of the federal vessel inspector, being the only statistics available on the subject. It should be said in explanation, however, that the method of reporting to the vessel inspector is such as to make the figures of passenger traffic for each port somewhat misleading.

TABLE 4. NUMBER AND GROSS TONNAGE OF SAILING VESSELS, STEAM VESSELS, CANAL BOATS AND BARGES DOCUMENTED ON THE NORTHERN LAKES FROM 1868 TO 1906.

| Year | Sailing | | Steam | | Canal Boats | | Barges | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Tons | No. | Tons | No. | Tons | No. | Tons | No. | Tons |
| 1868 | 1,855 | 298,978 | 624 | 144,117 | 2,822 | 241,553 | 64 | 15,956 | 5,365 | 695,604 |
| 1873 | 1,663 | 296,002 | 902 | 180,250 | 2,934 | 267,601 | 177 | 42,559 | 5,576 | 786,412 |
| 1878 | 1,546 | 315,908 | 918 | 201,550 | 519 | 41,902 | 183 | 45,296 | 3,166 | 604,656 |
| 1883 | 1,373 | 310,454 | 1,149 | 304,641 | 725 | 65,241 | 156 | 43,575 | 3,403 | 723,911 |
| 1888 | 1,277 | 314,765 | 1,342 | 480,133 | 598 | 61,005 | 44 | 18,194 | 3,290 | 874,102 |
| 1893 | 1,205 | 317,789 | 1,731 | 828,702 | 743 | 76,844 | 82 | 37,732 | 3,761 | 1,261,067 |
| 1898 | 960 | 333,704 | 1,764 | 993,644 | 334 | 40,456 | 148 | 69,696 | 3,256 | 1,437,500 |
| 1903 | 676 | 315,195 | 1,796 | 1,467,992 | 453 | 47,750 | 185 | 71,761 | 3,110 | 1,902,698 |
| 1906 | 519 | 269,136 | 1,844 | 1,841,433 | 480 | 50,599 | 209 | 73,259 | 3,052 | 2,234,432 |

NOTE 1—Northern Lakes includes the Great Lakes and the Minor Lakes and Canals in Michigan, Wisconsin, Minnesota and New York.

NOTE 2—This Table was taken from the Report of the Commissioner of Navigation 1906, Page 281.

NOTE 3—Documented—Registered Enrolled and licensed Vessels.

TABLE 5. NUMBER OF PASSENGERS CARRIED ON THE GREAT LAKES FROM THE MOST IMPORTANT PORTS, 1886-1906. REPORTS OF FEDERAL VESSEL INSPECTOR, 1886-1906.

| | Chicago | Milwaukee | Duluth | Detroit | Toledo | Cleveland | Buffalo |
|---|---|---|---|---|---|---|---|
| 1886 | 228,366 | 140,765 | 202,803 | 3,127,445 | ..... | 317,621 | 338,306 |
| 1887 | 159,968 | 192,416 | 179,354 | 2,795,653 | ..... | 588,949 | 318,137 |
| 1888 | 84,672 | 148,672 | 195,662 | 2,968,537 | ..... | 538,517 | 373,721 |
| 1889 | 240,490 | 153,517 | 115,153 | 3,153,844 | ..... | 631,272 | 408,891 |
| 1890 | 532,756 | 208,929 | 192,332 | 4,959,965 | ..... | 667,091 | 465,296 |
| 1891 | 429,144 | 180,434 | 249,620 | 5,246,311 | ..... | 504,983 | 622,267 |
| 1892 | 321,322 | 171,179 | 339,569 | 5,200,850 | ..... | 755,177 | 994,137 |
| 1893 | 2,290,830 | 214,492 | 440,633 | 5,263,357 | ..... | 720,918 | 816,479 |
| 1894 | 289,169 | 269,332 | 668,621 | 5,098,485 | ..... | 788,869 | 937,982 |
| 1895 | 543,142 | 544,172 | 732,837 | 5,101,211 | ..... | 1,026,011 | 1,081,789 |
| 1896 | 539,881 | 292,705 | 806,223 | 4,987,990 | ..... | 725,978 | 681,925 |
| 1897 | 500,238 | 317,423 | 607,071 | 5,303,119 | ..... | 690,539 | 496,168 |
| 1898 | 259,689 | 340,048 | 458,913 | 5,506,865 | ..... | 896,933 | 515,302 |
| 1899 | 325,514 | 391,971 | 690,472 | 6,019,026 | ..... | 1,068,859 | 826,431 |
| 1900 | 443,660 | 356,049 | 650,487 | 6,274,837 | 354,225 | 876,050 | 796,040 |
| 1901 | 487,442 | 400,438 | 1,179,549 | 6,179,893 | 530,074 | 298,750 | 1,390,945 |
| 1902 | 480,514 | 285,774 | 1,103,908 | 6,690,630 | 642,132 | 107,620 | 760,044 |
| 1903 | 592,659 | 275,705 | 983,888 | 7,219,886 | 695,772 | 105,159 | 561,063 |
| 1904 | 784,265 | 343,717 | 986,751 | 7,297,241 | 733,126 | 101,093 | 492,258 |
| 1905 | 1,210,837 | 451,010 | 655,677 | 6,795,439 | 1,288,520 | 955,770 | 887,983 |
| 1906 | 1,818,194 | 484,691 | 1,051,074 | 7,403,154 | 1,565,056 | 805,840 | 895,549 |

Number of passengers carried out of Chicago by boat in 1907 was 1,967,994.

Number of passengers reported at Chicago to Sept. 1st, '08, 1,676,524.

[1]These statistics are given as published in the reports of the federal vessel inspector, being the only statistics available on the subject. It should be said in explanation, however, that the method of reporting to the vessel inspector is such as to make the figures of passenger traffic for each port somewhat misleading.

CORN.
(Bushels.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 89,000 | 1,000 | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 25,158,878 | 23,810,848 | 51,713,312 | 37,584,588 | 44,939,308 | 38,661,377 | 40,161,705 |
| | Total | 25,247,878 | 23,811,848 | 51,713,312 | 37,584,588 | 44,939,308 | 38,661,377 | 40,161,705 |
| CLEVELAND | Receipts | 105,000 | 167,994 | 2,000 | 325,300 | ..... | 157,805 | 590,300 |
| | Shipments | 621,400 | 108 | 118,200 | ..... | ..... | ..... | ..... |
| | Total | 726,400 | 168,102 | 120,200 | 325,300 | ..... | 157,805 | 590,300 |
| DULUTH | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 654,650 | 82,935 | 3,861 | 2,736 | 2,490 | 6,860 | ..... |
| | Total | 654,650 | 82,935 | 3,861 | 2,736 | 2,490 | 6,860 | ..... |
| ESCANABA | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| FRANKFORT | Receipts | 219,650 | 58,000 | 30,572 | 23,222 | 24,800 | 5,155 | 26,100 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 219,650 | 58,000 | 30,572 | 23,222 | 24,800 | 5,155 | 26,100 |
| GRAND HAVEN | Receipts | 12,000 | ..... | 19,197 | 361,485 | 349,945 | 629,809 | 731,401 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | 10,084 |
| | Total | 12,000 | ..... | 19,197 | 361,485 | 349,945 | 629,809 | 741,485 |
| GREEN BAY | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 10,000 | 15,095 | ..... | ..... | ..... | ..... | 21,750 |
| | Total | 10,000 | 15,095 | ..... | ..... | ..... | ..... | 21,750 |
| LUDINGTON | Receipts | 887,567 | 197,234 | 834,730 | 669,527 | 847,919 | 1,006,652 | 1,276,512 |
| | Shipments | 20,000 | 670 | 2,534 | 1,000 | 2,800 | 1,765 | 4,500 |
| | Total | 907,567 | 197,904 | 837,264 | 670,527 | 850,719 | 1,008,417 | 1,281,012 |
| MANITOWOC | Receipts | 20,500 | ..... | ..... | ..... | 1,000 | ..... | 88 |
| | Shipments | 2,524,126 | 389,666 | 244,112 | 108,980 | 434,010 | 53,144 | 508,454 |
| | Total | 2,544,626 | 389,666 | 244,112 | 108,980 | 435,010 | 53,144 | 508,537 |
| MILWAUKEE | Receipts | ..... | 85,670 | 2,534 | 1,000 | 1,800 | 103,311 | 14,519 |
| | Shipments | 2,671,516 | 786,783 | 1,112,163 | 1,233,580 | 998,823 | 3,008,050 | 3,156,723 |
| | Total | 2,671,516 | 872,453 | 1,114,697 | 1,234,580 | 1,000,623 | 3,111,361 | 3,171,242 |
| SHEBOYGAN | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | 200 | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | 200 | ..... | ..... | ..... | ..... |

OATS.
(Bushels.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO–SO. CHICAGO | Receipts | 100 | 143,200 | 125,000 | 100 | 280 | ..... | ..... |
| | Shipments | 9,266,100 | 6,684,063 | 13,370,597 | 7,633,894 | 9,568,953 | 6,316,307 | 4,551,649 |
| | Total | 9,266,209 | 6,827,263 | 13,495,597 | 7,633,994 | 9,569,233 | 6,316,307 | 4,551,649 |
| CLEVELAND | Receipts | 77,800 | 101,000 | 353,555 | 432,000 | 352,941 | 385,000 | 1,028,000 |
| | Shipments | 207,929 | 2,000 | 400 | 1,500 | 2,700 | 2,000 | ..... |
| | Total | 285,729 | 103,000 | 353,955 | 433,500 | 361,641 | 387,000 | 1,028,000 |
| DULUTH | Receipts | 2,000 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 249,025 | 285,631 | 1,462,777 | 1,887,436 | 2,266,029 | 4,264,448 | 962,699 |
| | Total | 251,025 | 285,631 | 1,462,777 | 1,887,436 | 2,266,029 | 4,264,448 | 962,699 |
| ESCANABA | Receipts | 8,027 | 1,750 | 300 | ..... | ..... | ..... | ..... |
| | Shipments | ..... | 2,000 | ..... | ..... | 150,000 | ..... | ..... |
| | Total | 8,027 | 3,750 | 300 | ..... | 150,000 | ..... | ..... |
| FRANKFORT | Receipts | 3,220,762 | 552,537 | 519,750 | 238,547 | 986,027 | 1,270,535 | 985,500 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 3,220,762 | 552,537 | 519,750 | 238,547 | 986,027 | 1,270,535 | 985,500 |
| GRAND HAVEN | Receipts | 289,250 | 129,496 | 639,699 | 2,003,036 | 2,392,543 | 1,429,729 | 1,247,299 |
| | Shipments | ..... | ..... | ..... | ..... | 14,562 | ..... | 4,718 |
| | Total | 289,250 | 129,496 | 639,699 | 2,003,036 | 2,407,105 | 1,429,729 | 1,252,017 |
| GREEN BAY | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 2,165,666 | 1,881,100 | 2,935,100 | 1,542,362 | 2,743,400 | 2,580,530 | 1,960,300 |
| | Total | 2,165,666 | 1,881,100 | 2,935,100 | 1,542,362 | 2,743,400 | 2,580,530 | 1,960,300 |
| LUDINGTON | Receipts | 2,283,226 | 1,521,776 | 4,376,110 | 5,756,422 | 3,724,721 | 3,876,983 | 5,380,438 |
| | Shipments | ..... | 518 | 19,349 | 35,200 | 8,700 | 1,920 | 2,850 |
| | Total | 2,283,226 | 1,522,294 | 4,395,459 | 5,791,622 | 3,733,421 | 3,878,903 | 5,383,288 |
| MANITOWOC | Receipts | 18,000 | 16,155 | 7,500 | 9,000 | 10,000 | ..... | 1,000 |
| | Shipments | 7,207,757 | 1,979,821 | 3,735,415 | 4,513,859 | 5,389,670 | 4,809,338 | 5,179,607 |
| | Total | 7,225,757 | 1,995,976 | 3,742,915 | 4,522,859 | 5,399,670 | 4,809,338 | 5,180,607 |
| MILWAUKEE | Receipts | 2,000 | ..... | 13,849 | 27,950 | 18,062 | ..... | 6,568 |
| | Shipments | 5,508,462 | 3,107,585 | 6,797,010 | 4,821,566 | 4,504,068 | 3,664,468 | 4,956,107 |
| | Total | 5,510,462 | 3,107,585 | 6,810,859 | 4,849,516 | 4,522,130 | 3,664,468 | 4,962,675 |
| SHEBOYGAN | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | 150,000 | 3,000 | 50 | ..... | ..... | ..... |
| | Shipments | ..... | 150,000 | 3,000 | 50 | ..... | ..... | ..... |

BARLEY.
(Bushels.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 250 | 112,000 | ..... | 15,000 | 300 | ..... | ..... |
| | Shipments | 273,814 | 256,145 | 17,800 | 1,084,203 | 1,221,678 | 726,795 | ..... |
| | Total | 274,064 | 368,145 | 17,800 | 1,099,203 | 1,221,978 | 726,795 | ..... |
| CLEVELAND | Receipts | ..... | ..... | 55,000 | 55,000 | 89,000 | 158,200 | 173,500 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | 55,000 | 55,000 | 89,000 | 158,200 | 173,500 |
| DULUTH | Receipts | ..... | ..... | ..... | ..... | ..... | 62,000 | ..... |
| | Shipments | 195,500 | 1,338,159 | 1,198,415 | 1,234,690 | 782,776 | 29,606 | 100,000 |
| | Total | 195,500 | 1,338,159 | 1,198,415 | 1,234,690 | 782,776 | 91,606 | 100,000 |
| ESCANABA | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| FRANKFORT | Receipts | 231,361 | 289,100 | 198,206 | 716,663 | 1,012,780 | 1,304,570 | 306,000 |
| | Shipments | ..... | ..... | 1,000 | ..... | ..... | ..... | ..... |
| | Total | 231,361 | 289,100 | 199,206 | 716,663 | 1,012,780 | 1,304,570 | 306,000 |
| GRAND HAVEN | Receipts | 135,800 | 113,040 | 117,832 | 219,602 | 254,540 | 679,873 | 413,151 |
| | Shipments | ..... | ..... | ..... | ..... | 1,914 | ..... | 2,962 |
| | Total | 135,800 | 113,040 | 117,832 | 219,602 | 256,454 | 679,873 | 416,113 |
| GREEN BAY | Receipts | ..... | 587 | ..... | ..... | ..... | 208 | 458 |
| | Shipments | 812,700 | 801,000 | 1,226,150 | 952,050 | 933,410 | 1,008,433 | 923,800 |
| | Total | 812,700 | 801,587 | 1,226,150 | 952,050 | 933,410 | 1,008,641 | 924,258 |
| LUDINGTON | Receipts | 1,221,694 | 1,273,148 | 1,806,011 | 1,454,375 | 1,503,034 | 1,385,159 | 1,320,395 |
| | Shipments | 1,200 | 12,500 | 12,500 | 20,650 | 2,000 | 6,100 | 1,500 |
| | Total | 1,222,894 | 1,285,648 | 1,818,511 | 1,475,025 | 1,505,034 | 1,391,259 | 1,321,895 |
| MANITOWOC | Receipts | ..... | ..... | 24,000 | 16,650 | 6,250 | 11,100 | 2,500 |
| | Shipments | 926,618 | 899,570 | 956,928 | 1,880,780 | 2,139,664 | 1,973,573 | 726,135 |
| | Total | 926,618 | 899,570 | 980,928 | 1,897,430 | 2,145,914 | 1,984,673 | 728,635 |
| MILWAUKEE | Receipts | 1,200 | 12,500 | 66,000 | 4,000 | 1,914 | 5,000 | 2,962 |
| | Shipments | 3,061,391 | 3,466,667 | 5,041,059 | 5,732,307 | 4,166,311 | 4,178,990 | 2,929,576 |
| | Total | 3,062,591 | 3,479,167 | 5,107,059 | 5,736,307 | 4,168,225 | 4,183,990 | 2,932,538 |
| SHEBOYGAN | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

RYE.
(Bushels.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 326,500 | ..... | ..... | ..... | ..... | 20,000 | ..... |
| | Shipments | 81,913 | 1,631,041 | 1,650,569 | 222,600 | 153,646 | 476,786 | 729,411 |
| | Total | 406,413 | 1,631,041 | 1,650,569 | 222,600 | 153,646 | 496,786 | 729,411 |
| CLEVELAND | Receipts | 6,135 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 6,135 | ..... | ..... | ..... | ..... | ..... | ..... |
| DULUTH | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 219,500 | 191,233 | 295,402 | 269,558 | 126,500 | 292,000 | 263,575 |
| | Total | 219,500 | 191,233 | 295,402 | 269,558 | 126,500 | 292,000 | 263,575 |
| ESCANABA | Receipts | 2,442 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 2,442 | ..... | ..... | ..... | ..... | ..... | ..... |
| FRANKFORT | Receipts | 517,103 | 585,070 | 572,955 | 272,951 | 228,952 | 245,250 | 253,500 |
| | Shipments | ..... | 400 | ..... | ..... | ..... | ..... | ..... |
| | Total | 517,103 | 585,470 | 572,955 | 272,951 | 228,952 | 245,250 | 253,500 |
| GRAND HAVEN | Receipts | ..... | ..... | 8,600 | ..... | 4,235 | 47,703 | 34,231 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | 8,600 | ..... | 4,235 | 47,703 | 34,231 |
| GREEN BAY | Receipts | 3,103 | 8,435 | 4,800 | 400 | 1,471 | 8,142 | 4,900 |
| | Shipments | 157,142 | 25,500 | 115,000 | 85,000 | 65,000 | 182,000 | 23,800 |
| | Total | 160,245 | 33,935 | 119,800 | 85,400 | 66,471 | 190,142 | 28,700 |
| LUDINGTON | Receipts | 187,040 | 435,604 | 260,840 | 485,242 | 224,160 | 364,655 | 520,580 |
| | Shipments | 200 | 13,907 | 1,000 | ..... | 3,000 | 13,500 | ..... |
| | Total | 187,240 | 449,511 | 261,840 | 485,242 | 227,160 | 378,155 | 520,580 |
| MANITOWOC | Receipts | 10,568 | 16,400 | ..... | 5,404 | 11,500 | 15,500 | 4,000 |
| | Shipments | 661,455 | 454,785 | 533,181 | 404,959 | 85,491 | 303,999 | 158,950 |
| | Total | 672,023 | 471,185 | 533,181 | 410,363 | 96,991 | 319,499 | 162,950 |
| MILWAUKEE | Receipts | 200 | 3,240 | 1,000 | ..... | 1,000 | ..... | ..... |
| | Shipments | 230,783 | 909,455 | 499,880 | 543,014 | 88,485 | 317,985 | 432,084 |
| | Total | 230,983 | 912,695 | 500,880 | 543,014 | 89,485 | 317,985 | 432,084 |
| SHEBOYGAN | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

IRON ORE.
(Gross Tons.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 2,713,289 | 3,329,262 | 3,166,541 | 2,565,648 | 3,812,051 | 4,251,920 | 4,627,776 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 2,713,289 | 3,329,262 | 3,166,541 | 2,565,648 | 3,812,051 | 4,251,920 | 4,627,776 |
| CLEVELAND | Receipts | 3,528,455 | 4,929,279 | 4,386,805 | 3,453,961 | 5,702,381 | 6,662,040 | 6,567,469 |
| | Shipments | 110 | ..... | ..... | 2,547 | ..... | 330 | 4,547 |
| | Total | 3,528,565 | 4,929,279 | 4,386,805 | 3,456,508 | 5,702,381 | 6,662,379 | 6,572,016 |
| DULUTH | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 3,338,561 | 5,604,841 | 5,363,731 | 4,342,782 | 8,731,227 | 11,154,263 | 13,236,527 |
| | Total | 3,338,561 | 5,604,841 | 5,363,731 | 4,342,782 | 8,731,227 | 11,154,263 | 13,236,527 |
| ESCANABA | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 3,921,049 | 5,259,312 | 3,938,202 | 3,378,285 | 5,186,987 | 5,656,859 | 5,594,706 |
| | Total | 3,921,049 | 5,259,312 | 3,938,202 | 3,378,285 | 5,186,987 | 5,656,859 | 5,594,706 |
| FRANKFORT | Receipts | 2,462 | 1,455 | 560 | ..... | ..... | 26,101 | 26,641 |
| | Shipments | 40 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 2,502 | 1,455 | 560 | ..... | ..... | 26,101 | 26,641 |
| GRAND HAVEN | Receipts | 1,192 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 1,192 | ..... | ..... | ..... | ..... | ..... | ..... |
| GREEN BAY | Receipts | 40 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 2,273 | 1,436 | ..... | 1,838 | ..... | 2,550 | ..... |
| | Total | 2,313 | 1,436 | ..... | 1,838 | ..... | 2,550 | ..... |
| LUDINGTON | Receipts | ..... | 140 | ..... | ..... | 8,823 | 1,447 | ..... |
| | Shipments | ..... | ..... | ..... | 100 | ..... | 494 | 60 |
| | Total | ..... | 140 | ..... | 100 | ..... | 1,941 | 60 |
| MANITOWOC | Receipts | 40 | ..... | ..... | 100 | ..... | ..... | ..... |
| | Shipments | 2,164 | ..... | 3,512 | ..... | 1,969 | 855 | 200 |
| | Total | 2,204 | ..... | 3,512 | 100 | 1,969 | 855 | 200 |
| MILWAUKEE | Receipts | 227,294 | 252,652 | 201,419 | 157,402 | 199,017 | 272,717 | 238,661 |
| | Shipments | 4,265 | 6,197 | 6,361 | ..... | 8,919 | 9,183 | ..... |
| | Total | 221,559 | 258,849 | 207,780 | 157,402 | 207,936 | 281,900 | 238,661 |
| SHEBOYGAN | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 3,035 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 3,035 | ..... | ..... | ..... | ..... | ..... | ..... |

IRON, PIG.
(Gross Tons.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 23,753 | 14,844 | 7,626 | 7,777 | 36,362 | 30,556 | 10,488 |
| | Shipments | 1,356 | 1,610 | ..... | 50 | ..... | 155 | 1,381 |
| | Total | 25,109 | 16,454 | 7,626 | 7,827 | 36,362 | 30,711 | 11,869 |
| CLEVELAND | Receipts | 35,491 | 33,594 | 12,942 | 10,053 | 29,410 | 10,961 | 18,988 |
| | Shipments | 3,673 | 1,311 | 810 | 1,796 | 8,280 | 3,005 | 497 |
| | Total | 39,164 | 34,905 | 13,752 | 11,849 | 37,690 | 13,966 | 19,485 |
| DULUTH | Receipts | 25 | 1,335 | 422 | ..... | ..... | 940 | 50 |
| | Shipments | 46,948 | 27,350 | ..... | 8,661 | 48,846 | 53,333 | 16,963 |
| | Total | 46,973 | 28,685 | 422 | 8,661 | 48,846 | 54,273 | 16,913 |
| ESCANABA | Receipts | 10 | ..... | ..... | ..... | ..... | 12 | ..... |
| | Shipments | 19,834 | 14,437 | 5,444 | 7,233 | 11,344 | 38,064 | 3,203 |
| | Total | 19,844 | 14,437 | 5,444 | 7,233 | 11,344 | 38,076 | 3,203 |
| FRANKFORT | Receipts | 10,446 | 48,220 | 72,811 | 15,842 | 23,092 | 31,356 | 42,922 |
| | Shipments | 262 | 4,037 | 453 | 1,695 | 5,156 | 28,267 | 5,519 |
| | Total | 10,708 | 52,257 | 73,264 | 17,537 | 28,248 | 59,623 | 48,441 |
| GRAND HAVEN | Receipts | 45 | ..... | ..... | 135 | 334 | 212 | 678 |
| | Shipments | 20 | ..... | ..... | ..... | 113 | 161 | 65 |
| | Total | 65 | ..... | ..... | 135 | 447 | 373 | 743 |
| GREEN BAY | Receipts | 35 | 54 | ..... | ..... | ..... | 50 | 6 |
| | Shipments | 747 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 782 | 54 | ..... | ..... | ..... | 50 | 6 |
| LUDINGTON | Receipts | 319 | 1,630 | 712 | 2,740 | 9,244 | 2,482 | 9,296 |
| | Shipments | 7,170 | 11,944 | 1,275 | 1,808 | 4,914 | 14,755 | 20,424 |
| | Total | 7,489 | 13,574 | 1,987 | 4,548 | 14,158 | 17,237 | 29,720 |
| MANITOWOC | Receipts | 1,482 | 5,171 | 1,125 | 336 | 1,317 | 9,309 | 6,055 |
| | Shipments | 150 | 664 | 1,688 | ..... | 83 | 426 | 417 |
| | Total | 1,632 | 5,835 | 2,813 | 336 | 1,400 | 9,735 | 6,472 |
| MILWAUKEE | Receipts | 7,697 | 7,313 | 6,094 | 1,693 | 7,614 | 14,688 | 18,218 |
| | Shipments | 494 | 986 | 231 | 135 | 402 | 321 | 9,702 |
| | Total | 8,191 | 8,299 | 6,325 | 1,828 | 8,016 | 15,209 | 27,920 |
| SHEBOYGAN | Receipts | ..... | 100 | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | 1,250 |
| | Total | ..... | ..... | ..... | ..... | ..... | ..... | 1,250 |

IRON MFRS.
(Gross Tons.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 13,879 | 22,546 | 28,367 | 19,964 | 26,157 | 19,759 | 43,506 |
| | Shipments | 10,552 | 19,846 | 7,563 | 14,568 | 24,111 | 6,952 | 13,671 |
| | Total | 24,431 | 42,392 | 35,930 | 34,532 | 50,268 | 26,711 | 57,237 |
| CLEVELAND | Receipts | 7,959 | 629 | 1,133 | 1,955 | 58 | 788 | 327 |
| | Shipments | 87,534 | 139,988 | 121,429 | 111,085 | 203,670 | 277,575 | 237,735 |
| | Total | 95,493 | 140,617 | 122,562 | 113,040 | 203,728 | 278,363 | 238,062 |
| DULUTH | Receipts | 21,600 | 67,483 | 40,092 | 26,462 | 54,012 | 135,326 | 107,154 |
| | Shipments | ..... | 6,515 | 204 | 4 | 255 | 508 | 1,041 |
| | Total | 21,600 | 73,998 | 40,296 | 26,466 | 54,267 | 135,834 | 108,195 |
| ESCANABA | Receipts | 280 | 97 | 438 | 87 | 114 | 452 | 468 |
| | Shipments | ..... | ..... | ..... | ..... | 61 | 967 | 20 |
| | Total | 280 | 97 | 438 | 87 | 175 | 1,419 | 488 |
| FRANKFORT | Receipts | 12,289 | 14,319 | 2,733 | 1,348 | 1,660 | 806 | 880 |
| | Shipments | 85,808 | 69,059 | 27,836 | 20,461 | 13,673 | 20,457 | 3,679 |
| | Total | 98,097 | 83,378 | 30,569 | 21,809 | 15,333 | 21,263 | 4,559 |
| GRAND HAVEN | Receipts | 93 | 25 | ..... | 309 | 174 | 150 | ..... |
| | Shipments | 55 | 20 | ..... | 154 | 1,122 | ..... | 139 |
| | Total | 148 | 45 | ..... | 463 | 1,296 | 150 | 139 |
| GREEN BAY | Receipts | 360 | 2 | 2,803 | 577 | 940 | 808 | 1,241 |
| | Shipments | 50 | 114 | 25 | 1 | 33 | 1 | 22 |
| | Total | 410 | 116 | 2,828 | 578 | 973 | 809 | 1,263 |
| LUDINGTON | Receipts | 15,723 | 13,103 | 8,121 | 6,032 | 5,338 | 4,078 | 6,509 |
| | Shipments | 46,817 | 12,454 | 19,842 | 17,417 | 33,393 | 23,817 | 17,934 |
| | Total | 62,540 | 25,557 | 27,963 | 23,449 | 38,731 | 27,895 | 24,443 |
| MANITOWOC | Receipts | 87,842 | 49,621 | 18,067 | 12,157 | 11,856 | 13,739 | 8,132 |
| | Shipments | 11,445 | 10,113 | 1,216 | 1,646 | 2,199 | 770 | 1,435 |
| | Total | 99,287 | 59,734 | 19,283 | 13,803 | 14,055 | 14,509 | 9,567 |
| MILWAUKEE | Receipts | 34,902 | 15,660 | 22,622 | 13,166 | 33,107 | 26,354 | 27,569 |
| | Shipments | 17,655 | 10,746 | 8,450 | 5,227 | 2,906 | 3,381 | 5,444 |
| | Total | 52,557 | 26,406 | 31,072 | 18,393 | 36,013 | 29,735 | 33,013 |
| SHEBOYGAN | Receipts | ..... | ..... | ..... | ..... | ..... | 21 | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

SALT.
(Tons.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 372,501 | 348,019 | 250,029 | 217,506 | 226,844 | 204,936 | 222,447 |
| | Shipments | 6,134 | 5,342 | 4,997 | 1,348 | 553 | 2,629 | 707 |
| | Total | 378,635 | 353,361 | 255,026 | 218,854 | 227,397 | 207,568 | 223,154 |
| CLEVELAND | Receipts | 3,649 | 415 | 263 | 1,335 | 4,010 | 548 | 234 |
| | Shipments | 7,423 | 3,418 | 75 | 389 | 216 | 223 | 413 |
| | Total | 11,072 | 3,833 | 338 | 1,724 | 4,226 | 771 | 647 |
| DULUTH | Receipts | 36,888 | 42,960 | 50,530 | 29,113 | 43,212 | 43,922 | 45,008 |
| | Shipments | ..... | 270 | 50 | ..... | ..... | ..... | 821 |
| | Total | 36,888 | 43,230 | 50,580 | 29,113 | 43,212 | 43,922 | 45,829 |
| ESCANABA | Receipts | 87 | 10 | ..... | 374 | 376 | 476 | 445 |
| | Shipments | ..... | 11 | ..... | 8 | ..... | ..... | 8 |
| | Total | 87 | 21 | ..... | 382 | 376 | 476 | 453 |
| FRANKFORT | Receipts | 80 | ..... | ..... | 8 | ..... | 4 | 50 |
| | Shipments | 5,549 | 5,908 | 965 | 1,578 | 187 | 1,423 | 2,210 |
| | Total | 5,629 | 5,908 | 965 | 1,586 | 187 | 1,427 | 2,260 |
| GRAND HAVEN | Receipts | 102 | 180 | 68 | ..... | 98 | 18 | ..... |
| | Shipments | 3,320 | 249 | 399 | 1,008 | 2,975 | 3,961 | 3,940 |
| | Total | 3,422 | 429 | 467 | 1,008 | 3,073 | 3,979 | 3,940 |
| GREEN BAY | Receipts | 5,575 | 9,597 | 3,459 | 11,889 | 7,121 | 8,343 | 6,115 |
| | Shipments | 129 | 337 | 128 | 265 | 147 | 183 | 357 |
| | Total | 5,704 | 9,934 | 3,587 | 12,154 | 7,268 | 8,526 | 6,472 |
| LUDINGTON | Receipts | 100 | ..... | 160 | 1,293 | 26 | 30 | ..... |
| | Shipments | 89,185 | 66,909 | 59,278 | 79,678 | 110,918 | 127,220 | 165,312 |
| | Total | 89,285 | 66,900 | 59,438 | 80,971 | 110,944 | 127,250 | 165,312 |
| MANITOWOC | Receipts | 5,402 | 9,630 | 6,752 | 11,448 | 3,752 | 8,955 | 14,486 |
| | Shipments | 160 | 15 | 123 | 300 | 26 | ..... | 4 |
| | Total | 5,562 | 9,645 | 6,875 | 11,748 | 3,778 | 8,955 | 14,490 |
| MILWAUKEE | Receipts | 149,722 | 78,882 | 136,225 | 145,016 | 133,891 | 139,076 | 143,099 |
| | Shipments | 1,233 | ..... | 180 | 2,095 | 98 | 33 | ..... |
| | Total | 150,955 | 78,882 | 136,405 | 147,111 | 133,989 | 139,109 | 143,099 |
| SHEBOYGAN | Receipts | 23,252 | 59,141 | 48,092 | 24,540 | 22,323 | 25,326 | 14,250 |
| | Shipments | ..... | ..... | ..... | 8 | 450 | ..... | 2,000 |
| | Total | 23,252 | 59,141 | 48,092 | 24,548 | 22,773 | 25,326 | 16,250 |

COPPER.
(Gross Tons.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 3,932 | 3,728 | 3,769 | 3,862 | 3,429 | 4,108 | 2,978 |
| | Shipments | 19,405 | 15 | 100 | ..... | ..... | 25 | ..... |
| | Total | 23,337 | 3,743 | 3,869 | 3,862 | 3,429 | 4,133 | 2,978 |
| CLEVELAND | Receipts | 808 | 2,859 | 1,855 | 898 | 2,396 | 565 | 860 |
| | Shipments | 297 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 1,105 | 2,859 | 1,855 | 898 | 2,396 | 565 | 860 |
| DULUTH | Receipts | 190 | 556 | 124 | 45 | 30 | 8,402 | 75 |
| | Shipments | 18,263 | 1,638 | 2,656 | 766 | ..... | 100 | 30 |
| | Total | 18,453 | 2,194 | 2,780 | 811 | 30 | 8,502 | 105 |
| ESCANABA | Receipts | 40 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 40 | ..... | ..... | ..... | ..... | ..... | ..... |
| FRANKFORT | Receipts | ..... | 85 | 5,565 | 1,861 | 8,808 | 5,996 | 1,825 |
| | Shipments | ..... | 245 | ..... | ..... | ..... | ..... | ..... |
| | Total | ..... | 330 | 5,565 | 1,861 | 8,808 | 5,996 | 1,825 |
| GRAND HAVEN | Receipts | ..... | ..... | ..... | 1,120 | 105 | 103 | 2,397 |
| | Shipments | 55 | ..... | ..... | 15 | 16 | 75 | 77 |
| | Total | 55 | ..... | ..... | 1,135 | 121 | 178 | 2,474 |
| GREEN BAY | Receipts | 100 | ..... | ..... | ..... | 20 | ..... | ..... |
| | Shipments | 40 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 140 | ..... | ..... | ..... | 20 | ..... | ..... |
| LUDINGTON | Receipts | 4,263 | 20,287 | 19,856 | 18,852 | 2,511 | 2,422 | 7,618 |
| | Shipments | 100 | 200 | 40 | 4 | ..... | ..... | 15 |
| | Total | 4,363 | 20,487 | 19,896 | 18,856 | 2,511 | 2,422 | 7,633 |
| MANITOWOC | Receipts | 200 | 445 | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 5,183 | 18,809 | 12,921 | 16,014 | 9,188 | 6,051 | 4,609 |
| | Total | 5,383 | 19,254 | 12,921 | 16,014 | 9,188 | 6,051 | 4,609 |
| MILWAUKEE | Receipts | 1,602 | 125 | 215 | 474 | 349 | 275 | 172 |
| | Shipments | 20 | 195 | 15,970 | 6,108 | 2,243 | 2,379 | ..... |
| | Total | 1,622 | 320 | 16,185 | 6,582 | 2,592 | 2,654 | 172 |
| SHEBOYGAN | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 150 | ..... | ..... | ..... | ..... | ..... | ..... |
| | Total | 150 | ..... | ..... | ..... | ..... | .. | ..... |

LUMBER.
(M. Feet.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 715,622 | 653,857 | 432,889 | 390,307 | 423,993 | 405,422 | 376,263 |
| | Shipments | 4,450 | 3,745 | 991 | 1,560 | 1,096 | 813 | 996 |
| | Total | 720,072 | 657,602 | 433,880 | 391,867 | 425,091 | 406,235 | 377,261 |
| CLEVELAND | Receipts | 313,707 | 286,672 | 241,235 | 194,545 | 221,081 | 175,100 | 109,169 |
| | Shipments | 2,153 | 1,155 | 1,372 | 125 | 137 | 1,513 | 630 |
| | Total | 315,860 | 287,827 | 242,607 | 194,670 | 221,218 | 176,613 | 109,799 |
| DULUTH | Receipts | 9,335 | 2,550 | 1,881 | 2,251 | 278 | 3,273 | 1,154 |
| | Shipments | 339,194 | 329,437 | 355,712 | 344,109 | 357,814 | 461,477 | 290,564 |
| | Total | 348,529 | 331,987 | 357,593 | 346,360 | 358,092 | 464,750 | 291,718 |
| ESCANABA | Receipts | 15 | 31 | ..... | 372 | 1,010 | 530 | ..... |
| | Shipments | 4,045 | 6,443 | 5,304 | 15,848 | 5,172 | 10,412 | 12,799 |
| | Total | 4,060 | 6,474 | 5,304 | 16,220 | 6,182 | 10,942 | 12,799 |
| FRANKFORT | Receipts | 60,023 | 60,390 | 83,509 | 61,473 | 76,738 | 58,912 | 55,549 |
| | Shipments | 23,611 | 30,564 | 16,395 | 15,756 | 14,426 | 14,397 | 9,979 |
| | Total | 83,634 | 90,954 | 99,904 | 77,229 | 91,164 | 73,309 | 65,528 |
| GRAND HAVEN | Receipts | 863 | 304 | 431 | 822 | 11,377 | 14,958 | 12,608 |
| | Shipments | 220 | ..... | 50 | ..... | 721 | 721 | 1,525 |
| | Total | 1,083 | 304 | 481 | 822 | 12,098 | 15,679 | 14,133 |
| GREEN BAY | Receipts | 1,513 | 2,817 | 2,052 | 2,242 | 425 | 318 | 162 |
| | Shipments | 23,645 | 15,044 | 10,517 | 14,510 | 11,261 | 9,556 | 20 |
| | Total | 25,158 | 17,861 | 12,569 | 16,752 | 11,686 | 9,874 | 182 |
| LUDINGTON | Receipts | 67,600 | 52,209 | 122,161 | 156,798 | 168,956 | 140,770 | 105,137 |
| | Shipments | 35,278 | 33,667 | 24,979 | 25,627 | 32,214 | 33,009 | 32,831 |
| | Total | 102,878 | 85,876 | 147,140 | 182,425 | 201,170 | 173,779 | 137,968 |
| MANITOWOC | Receipts | 15,371 | 14,559 | 9,890 | 15,161 | 13,099 | 9,749 | 7,726 |
| | Shipments | 56,697 | 41,849 | 102,324 | 121,222 | 120,599 | 115,612 | 96,094 |
| | Total | 72,068 | 56,408 | 112,214 | 136,383 | 133,698 | 125,361 | 103,820 |
| MILWAUKEE | Receipts | 129,516 | 122,542 | 102,414 | 85,738 | 85,197 | 71,956 | 71,489 |
| | Shipments | 26,457 | 24,020 | 44,227 | 47,037 | 61,352 | 57,030 | 42,322 |
| | Total | 155,973 | 146,562 | 146,641 | 132,775 | 146,549 | 128,986 | 113,811 |
| SHEBOYGAN | Receipts | 21,595 | 21,808 | 12,823 | 10,715 | 7,965 | 8,523 | 8,051 |
| | Shipments | 3,730 | 1,104 | 1,570 | 1,730 | 1,290 | ..... | 50 |
| | Total | 25,325 | 22,912 | 14,393 | 12,445 | 9,275 | 8,523 | 8,101 |

LOGS.
(M. Feet.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO-SO. CHICAGO | Receipts | 518 | ..... | 495 | 620 | 1,090 | 2,400 | 1,320 |
| | Shipments | ..... | ..... | ..... | 5 | ..... | 350 | * |
| | Total | 518 | ..... | 495 | 625 | 1,090 | 2,750 | 1,320 |
| CLEVELAND | Receipts | 2,322 | ..... | 844 | 110 | 240 | 132 | ..... |
| | Shipments | ..... | ..... | ..... | ..... | 300 | ..... | * |
| | Total | 2,322 | ..... | 844 | 110 | 540 | 132 | ..... |
| DULUTH | Receipts | 28,829 | 34,971 | 62,100 | 26,718 | 29,065 | 20,824 | 72 |
| | Shipments | 5,400 | 4,500 | 340 | 2,650 | ..... | 1,025 | * |
| | Total | 34,229 | 39,471 | 62,440 | 29,368 | 29,065 | 21,849 | 72 |
| ESCANABA | Receipts | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | Shipments | 793 | 300 | 9,150 | 6,450 | 100 | 476 | * |
| | Total | 793 | 300 | 9,150 | 6,450 | 100 | 476 | ..... |
| FRANKFORT | Receipts | ..... | ..... | 2 | ..... | 151 | 179 | 306 |
| | Shipments | ..... | ..... | ..... | ..... | 200 | ..... | * |
| | Total | ..... | ..... | ..... | ..... | 351 | 179 | 306 |
| GRAND HAVEN | Receipts | ..... | ..... | 128 | ..... | 18 | 32 | ..... |
| | Shipments | ..... | ..... | ..... | ..... | 10 | ..... | * |
| | Total | ..... | ..... | 128 | ..... | 28 | 32 | ..... |
| GREEN BAY | Receipts | ..... | ..... | 10,074 | ..... | 100 | ..... | 1,781 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | * |
| | Total | ..... | ..... | 10,074 | ..... | 100 | ..... | 1,781 |
| LUDINGTON | Receipts | ..... | ..... | 59 | 112 | 512 | 438 | 55 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | 120 | * |
| | Total | ..... | ..... | 59 | 112 | 512 | 558 | 55 |
| MANITOWOC | Receipts | ..... | 1,150 | 300 | ..... | ..... | ..... | ..... |
| | Shipments | ..... | ..... | ..... | 46 | 13 | 35 | * |
| | Total | ..... | 1,150 | 300 | 46 | 13 | 35 | ..... |
| MILWAUKEE | Receipts | 35 | 250 | 8 | ..... | 28 | 1,085 | 120 |
| | Shipments | ..... | ..... | ..... | ..... | 13 | 104 | * |
| | Total | 35 | 250 | 8 | ..... | 41 | 1,189 | 120 |
| SHEBOYGAN | Receipts | 200 | ..... | ..... | 820 | ..... | 87 | 670 |
| | Shipments | ..... | ..... | ..... | ..... | ..... | ..... | * |
| | Total | 200 | ..... | ..... | 820 | ..... | 87 | 670 |

* Shipments of Logs included in Unclassed Frt.

UNCLASSED.
(Tons.)

| PORTS | | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|
| CHICAGO–SO. CHICAGO | Receipts | 978,562 | 1,363,944 | 1,094,878 | 925,598 | 1,098,054 | 1,035,317 | 1,089,074 |
| | Shipments | 486,777 | 535,474 | 550,206 | 507,010 | 640,042 | 604,693 | 644,604 |
| | Total | 1,465,339 | 1,899,418 | 1,645,084 | 1,432,608 | 1,738,096 | 1,640,010 | 1,733,678 |
| CLEVELAND | Receipts | 372,765 | 350,985 | 475,332 | 455,529 | 468,685 | 367,891 | 525,835 |
| | Shipments | 150,943 | 182,992 | 221,325 | 165,069 | 213,776 | 205,716 | 216,259 |
| | Total | 523,708 | 533,977 | 696,657 | 620,598 | 682,461 | 573,607 | 742,094 |
| DULUTH | Receipts | 151,929 | 234,057 | 180,985 | 161,155 | 211,091 | 256,385 | 313,258 |
| | Shipments | 47,272 | 52,895 | 50,413 | 43,050 | 325,174 | 305,541 | 320,573 |
| | Total | 199,201 | 286,952 | 231,398 | 204,205 | 536,265 | 561,926 | 633,831 |
| ESCANABA | Receipts | 8,978 | 27,548 | 12,142 | 5,815 | 9,200 | 10,000 | 8,342 |
| | Shipments | 7,343 | 5,713 | 6,062 | 4,535 | 3,738 | 3,611 | 2,645 |
| | Total | 16,321 | 33,261 | 18,204 | 10,350 | 12,938 | 13,611 | 10,987 |
| FRANKFORT | Receipts | 100,852 | 105,299 | 119,072 | 76,054 | 105,404 | 133,983 | 158,605 |
| | Shipments | 116,039 | 142,023 | 113,164 | 88,253 | 142,231 | 128,222 | 107,638 |
| | Total | 216,891 | 247,322 | 232,236 | 164,307 | 247,635 | 262,205 | 266,243 |
| GRAND HAVEN | Receipts | 49,067 | 63,174 | 66,393 | 116,970 | 120,687 | 131,334 | 154,244 |
| | Shipments | 21,757 | 49,288 | 39,549 | 71,755 | 83,578 | 108,135 | 143,883 |
| | Total | 70,824 | 112,462 | 105,942 | 188,725 | 204,265 | 239,469 | 298,127 |
| GREEN BAY | Receipts | 52,836 | 76,840 | 59,529 | 73,489 | 126,452 | 228,912 | 136,033 |
| | Shipments | 11,234 | 15,799 | 15,650 | 10,984 | 11,064 | 10,675 | 10,896 |
| | Total | 64,070 | 92,639 | 75,179 | 84,473 | 137,516 | 239,587 | 146,929 |
| LUDINGTON | Receipts | 205,761 | 280,380 | 272,511 | 266,849 | 234,271 | 199,898 | 262,682 |
| | Shipments | 227,753 | 249,067 | 234,005 | 220,039 | 228,113 | 204,864 | 299,343 |
| | Total | 433,514 | 529,447 | 506,606 | 486,888 | 462,384 | 404,762 | 562,025 |
| MANITOWOC | Receipts | 178,127 | 215,842 | 195,927 | 148,686 | 164,602 | 161,509 | 230,966 |
| | Shipments | 204,347 | 239,562 | 214,322 | 169,500 | 160,576 | 157,437 | 201,039 |
| | Total | 382,474 | 455,404 | 410,249 | 318,186 | 325,178 | 318,946 | 432,005 |
| MILWAUKEE | Receipts | 570,052 | 669,038 | 570,160 | 564,997 | 656,785 | 694,780 | 989,046 |
| | Shipments | 353,371 | 395,134 | 413,534 | 398,098 | 459,336 | 468,170 | 556,874 |
| | Total | 923,423 | 1,064,172 | 983,694 | 963,095 | 1,116,121 | 1,162,950 | 1,545,920 |
| SHEBOYGAN | Receipts | 33,741 | 35,171 | 34,213 | 23,808 | 28,548 | 26,832 | 30,083 |
| | Shipments | 13,326 | 13,698 | 18,488 | 10,921 | 14,860 | 831 | 11,356 |
| | Total | 47,067 | 48,869 | 52,701 | 34,729 | 43,408 | 27,713 | 41,439 |

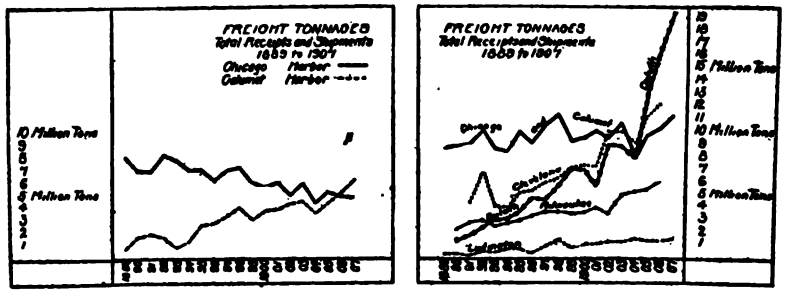
RECEIPTS AND SHIPMENTS OF PRINCIPAL COMMODITIES BY LAKE AND BY RAIL AT CHICAGO-SOUTH CHICAGO AND MILWAUKEE.
Tons (2000 lbs.)

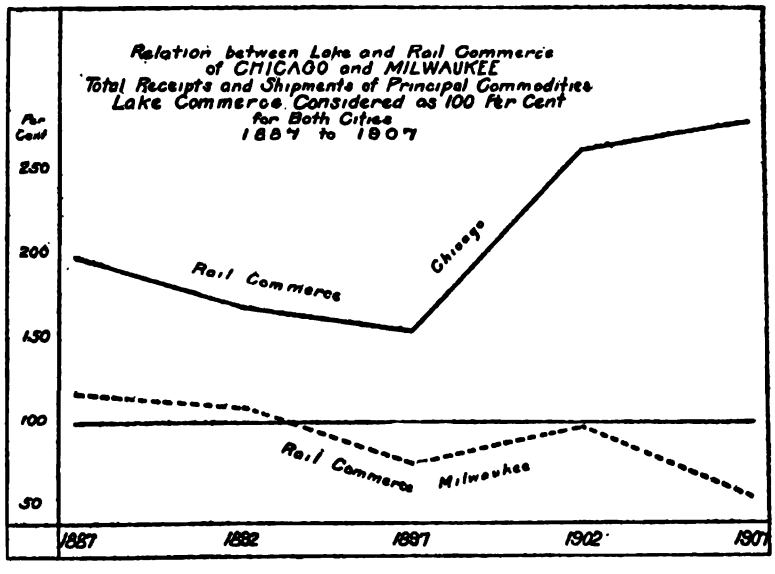
| | CHICAGO-SOUTH CHICAGO | | | | | | MILWAUKEE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | By Lake | | | By Rail | | | By Lake | | | By Rail | | |
| Years | Receipts | Shipments | Total | Receipts | Shipm'ts | Total | Receipts | Shipm'ts | Total | Receipts | Shipments | Total |
| 1887 | 4,398,354 | 1,761,596 | 6,159,950 | 8,038,095 | 4,202,666 | 12,240,761 | 1,100,047 | 320,896 | 1,420,943 | 962,519 | 706,777 | 1,661,296 |
| 1892 | 6,026,626 | 2,493,653 | 8,520,279 | 10,074,615 | 4,369,281 | 14,443,896 | 1,801,730 | 288,512 | 2,090,242 | 1,373,341 | 913,657 | 2,286,998 |
| 1897 | 5,650,952 | 3,088,728 | 8,739,680 | 10,728,848 | 2,870,775 | 13,599,623 | 1,993,705 | 291,625 | 2,285,330 | 725,695 | 989,816 | 1,715,011 |
| 1902 | 6,026,422 | 1,637,170 | 7,663,592 | 15,669,149 | 4,538,045 | 20,207,194 | 2,039,993 | 282,405 | 2,322,398 | 1,201,057 | 1,049,090 | 2,250,147 |
| 1907 | 8,112,177 | 2,065,837 | 10,178,014 | 21,864,746 | 7,781,245 | 29,645,991 | 4,728,892 | 561,094 | 5,289,976 | 1,864,662 | 1,567,749 | 2,932,411 |

Compiled from
Chicago Board of Trade Reports.

Compiled from
Milwaukee Chamber of Commerce Reports.

Principal Commodities — Flour, Wheat, Corn, Coal, Iron Ore, Lumber, Salt, Sugar.


FREIGHT TONNAGES
Total Receipts and Shipments
1889 to 1907
Chicago Harbor
Columet Harbor
10 Million Tons
1 Million Tons
FREIGHT TONNAGES
Total Receipts and Shipments
1888 to 1907
Chicago
Columet
Duluth
Buffalo
Milwaukee
Escanaba
Ludington
Million Tons


Relation between Lake and Rail Commerce
of CHICAGO and MILWAUKEE
Total Receipts and Shipments of Principal Commodities
Lake Commerce Considered as 100 Per Cent
for Both Cities
1887 to 1907
Per Cent
250
200
150
100
50
Rail Commerce
Chicago
Rail Commerce
Milwaukee
1887
1892
1897
1902
1907

COMPARATIVE RECEIPTS AND SHIPMENTS BY LAKE AND RAIL FOR CHICAGO-SOUTH CHICAGO.

LUMBER (M. Feet).
Chicago Board of Trade Reports.

| | CHICAGO-SOUTH CHICAGO | | | | | |
|---|---|---|---|---|---|---|
| | By Lake | | | By Rail | | |
| Years | Receipts | Shipments | Total | Receipts | Shipments | Total |
| 1886 | 1,427,795 | 1890 | 1,429,685 | 315,189 | 856,568 | 1,171,757 |
| 1887 | 1,457,179 | 436 | 1,457,609 | 422,995 | 921,056 | 1,344,051 |
| 1888 | 1,626,008 | ..... | 1,626,408 | 440,519 | 773,247 | 1,213,766 |
| 1889 | 1,447,390 | 4,660 | 1,452,059 | 462,044 | 719,033 | 1,181,077 |
| 1890 | 1,359,921 | 926 | 1,360,847 | 581,471 | 795,272 | 1,376,743 |
| 1891 | 1,359,315 | 312 | 1,359,627 | 686,103 | 847,635 | 1,533,738 |
| 1892 | 1,443,769 | 110 | 1,443,879 | 760,105 | 1,048,855 | 1,808,960 |
| 1893 | 955,280 | 620 | 955,900 | 645,397 | 712,985 | 1,358,382 |
| 1894 | 1,075,763 | ..... | 1,075,763 | 486,764 | 623,592 | 1,110,356 |
| 1895 | 1,073,847 | 3 | 1,073,850 | 564,283 | 769,006 | 1,333,289 |
| 1896 | 779,292 | ..... | 779,292 | 507,351 | 597,336 | 1,104,687 |
| 1897 | 917,212 | ..... | 917,212 | 489,368 | 573,520 | 1,062,888 |
| 1898 | 869,922 | 450 | 870,372 | 686,725 | 688,842 | 1,375,567 |
| 1899 | 793,788 | ..... | 793,788 | 898,793 | 736,177 | 1,634,970 |
| 1900 | 590,270 | 271 | 590,541 | 1,006,476 | 769,220 | 1,775,696 |
| 1901 | 730,691 | 560 | 731,251 | 1,256,889 | 892,423 | 2,149,312 |
| 1902 | 644,076 | 650 | 644,726 | 1,425,309 | 886,722 | 2,312,031 |
| 1903 | 459,848 | 461 | 460,309 | 1,251,500 | 803,385 | 2,054,885 |
| 1904 | 402,889 | 52 | 402,891 | 1,267,433 | 820,956 | 2,088,389 |
| 1905 | 458,198 | ..... | 458,198 | 1,735,342 | 956,377 | 2,691,719 |
| 1906 | 428,835 | 178 | 429,013 | 1,934,021 | 1,041,295 | 2,975,316 |
| 1907 | 411,947 | 1,389 | 413,336 | 2,067,511 | 976,357 | 3,043,868 |

## COMPARATIVE RECEIPTS AND SHIPMENTS BY LAKE AND RAIL FOR CHICAGO-SOUTH CHICAGO.

**SALT (Bbls.).**
**Chicago Board of Trade Reports.**

| | CHICAGO-SOUTH CHICAGO | | | | | |
|---|---|---|---|---|---|---|
| | By Lake | | | By Rail | | |
| Years | Receipts | Shipments | Total | Receipts | Shipments | Total |
| 1886 | 453,811 | 1,625 | 455,436 | 1,075,524 | 1,237,615 | 2,313,139 |
| 1887 | 779,382 | 3,586 | 782,968 | 1,158,225 | 1,402,185 | 2,560,410 |
| 1888 | 693,970 | 2,513 | 696,483 | 882,082 | 1,120,172 | 2,002,254 |
| 1889 | 524,333 | 5,705 | 530,038 | 784,980 | 1,045,462 | 1,830,442 |
| 1890 | 253,241 | 433 | 253,674 | 1,159,309 | 956,198 | 2,115,507 |
| 1891 | 427,149 | 312 | 427,461 | 918,424 | 794,655 | 1,713,079 |
| 1892 | 487,507 | 553 | 488,060 | 756,214 | 643,737 | 1,399,951 |
| 1893 | 612,414 | 1,030 | 613,444 | 678,795 | 750,499 | 1,429,294 |
| 1894 | 806,391 | 4,617 | 811,008 | 481,130 | 668,735 | 1,149,865 |
| 1895 | 1,496,998 | 100 | 1,497,098 | 497,058 | 805,377 | 1,302,435 |
| 1896 | 1,533,781 | 1,268 | 1,535,049 | 484,201 | 995,886 | 1,480,087 |
| 1897 | 1,606,265 | 140 | 1,606,405 | 173,718 | 921,915 | 1,095,633 |
| 1898 | 1,558,477 | 800 | 1,559,277 | 434,560 | 1,028,455 | 1,463,015 |
| 1899 | 1,666,087 | 410 | 1,666,497 | 586,085 | 1,064,498 | 1,650,583 |
| 1900 | 2,301,280 | 20,090 | 2,321,370 | 585,804 | 772,669 | 1,357,473 |
| 1901 | 2,745,883 | 38,055 | 2,783,938 | 317,508 | 394,000 | 711,508 |
| 1902 | 2,322,740 | 18,860 | 2,341,600 | 457,029 | 338,106 | 795,135 |
| 1903 | 1,768,807 | 28,561 | 1,797,428 | 563,247 | 460,009 | 1,023,256 |
| 1904 | 1,566,119 | 3,425 | 1,563,544 | 445,040 | 372,408 | 817,448 |
| 1905 | 1,581,923 | 3,550 | 1,585,473 | 402,276 | 329,370 | 731,646 |
| 1906 | 1,397,906 | 1,200 | 1,399,106 | 413,474 | 243,262 | 656,736 |
| 1907 | 1,515,894 | ..... | 1,515,894 | 392,992 | 409,939 | 802,931 |

COMPARATIVE RECEIPTS AND SHIPMENTS BY LAKE AND RAIL FOR CHICAGO-SOUTH CHICAGO.

FLOUR (Barrels).
Chicago Board of Trade Reports, Canadian Trade Included.

| | CHICAGO-SOUTH CHICAGO | | | | | |
|---|---|---|---|---|---|---|
| | By Lake | | | By Rail | | |
| Years | Receipts | Shipments | Total | Receipts | Shipments | Total |
| 1886 | 8,379 | 1,391,235 | 1,399,614 | 4,027,349 | 2,386,675 | 6,414,024 |
| 1887 | 18,799 | 1,544,196 | 1,562,995 | 6,722,625 | 4,835,471 | 11,558,096 |
| 1888 | 14,011 | 1,711,870 | 1,725,881 | 6,000,840 | 3,780,730 | 9,781,570 |
| 1889 | 11,033 | 1,811,467 | 1,822,500 | 4,310,671 | 2,102,487 | 6,413,158 |
| 1890 | 31,765 | 1,757,745 | 1,789,510 | 4,233,117 | 2,371,213 | 6,604,330 |
| 1891 | 22,747 | 1,640,738 | 1,663,485 | 4,404,048 | 2,403,327 | 6,807,375 |
| 1892 | 36,810 | 2,455,206 | 2,492,016 | 5,793,776 | 3,254,950 | 9,048,726 |
| 1893 | 16,007 | 1,471,060 | 1,487,067 | 4,564,997 | 2,633,856 | 7,198,853 |
| 1894 | 78,627 | 1,630,345 | 1,708,972 | 4,016,589 | 2,083,662 | 6,100,251 |
| 1895 | 88,717 | 791,620 | 880,337 | 2,941,395 | 1,740,380 | 4,681,775 |
| 1896 | 55,404 | 1,006,951 | 1,062,355 | 2,429,746 | 1,847,881 | 4,277,627 |
| 1897 | 85,094 | 1,060,734 | 1,145,828 | 2,782,566 | 1,675,127 | 4,457,693 |
| 1898 | 46,732 | 713,633 | 760,365 | 5,159,666 | 4,318,603 | 9,478,269 |
| 1899 | 39,938 | 800,906 | 840,844 | 5,768,033 | 4,620,557 | 10,388,590 |
| 1900 | 28,550 | 1,121,748 | 1,150,298 | 9,242,728 | 6,274,949 | 15,517,677 |
| 1901 | 36,506 | 918,763 | 955,269 | 10,195,779 | 7,020,396 | 17,216,165 |
| 1902 | 37,506 | 1,086,836 | 1,124,342 | 7,357,701 | 4,752,605 | 12,110,306 |
| 1903 | 17,967 | 1,265,483 | 1,283,450 | 7,742,260 | 4,569,388 | 12,311,648 |
| 1904 | 7,380 | 703,361 | 710,741 | 8,777,105 | 6,562,481 | 15,339,586 |
| 1905 | 1,250 | 2,399,502 | 2,400,752 | 7,922,489 | 4,962,365 | 12,884,854 |
| 1906 | 3,250 | 2,609,046 | 2,612,296 | 9,031,217 | 5,590,582 | 14,621,799 |
| 1907 | 1,120 | 3,270,651 | 3,271,771 | 9,434,191 | 5,961,042 | 15,395,233 |

## COMPARATIVE RECEIPTS AND SHIPMENTS BY LAKE AND RAIL FOR CHICAGO-SOUTH CHICAGO.

COAL (Tons).
Chicago Board of Trade Reports.

| | CHICAGO-SOUTH CHICAGO | | | | | |
|---|---|---|---|---|---|---|
| | By Lake | | | By Rail | | |
| Years | Receipts | Shipments | Total | Receipts | Shipments | Total |
| 1886 | 933,326 | 1,634 | 934,960 | 3,122,692 | 900,267 | 4,022,959 |
| 1887 | 941,847 | ..... | 941,847 | 4,318,833 | 1,095,402 | 5,414,235 |
| 1888 | 1,363,421 | ..... | 1,363,421 | 4,153,938 | 965,849 | 5,119,787 |
| 1889 | 1,323,821 | 113 | 1,323,934 | 3,513,861 | 642,799 | 4,156,660 |
| 1890 | 1,100,562 | 71 | 1,100,633 | 3,636,822 | 718,135 | 4,354,957 |
| 1891 | 1,227,023 | 1,600 | 1,228,623 | 3,974,610 | 826,751 | 4,801,361 |
| 1892 | 1,334,972 | 510 | 1,335,482 | 4,194,496 | 939,820 | 5,134,316 |
| 1893 | 1,346,274 | 1,504 | 1,347,778 | 5,068,101 | 955,383 | 6,023,484 |
| 1894 | 1,208,120 | ..... | 1,208,120 | 4,128,004 | 810,086 | 4,938,090 |
| 1895 | 1,254,876 | 4,050 | 1,258,926 | 4,836,408 | 981,018 | 5,817,426 |
| 1896 | 1,351,699 | 2,134 | 1,353,833 | 4,971,074 | 859,466 | 5,830,540 |
| 1897 | 1,318,965 | 2,225 | 1,321,190 | 5,491,257 | 851,233 | 6,342,490 |
| 1898 | 1,527,511 | 275 | 1,527,786 | 5,859,689 | 845,162 | 6,704,851 |
| 1899 | 1,302,740 | 300 | 1,303,040 | 7,365,316 | 1,513,740 | 8,879,056 |
| 1900 | 991,297 | 360 | 991,657 | 7,848,360 | 1,465,410 | 9,313,770 |
| 1901 | 1,075,866 | 1,760 | 1,077,626 | 8,364,086 | 1,402,804 | 9,766,890 |
| 1902 | 299,604 | ..... | 299,604 | 9,535,353 | 1,577,757 | 11,113,110 |
| 1903 | 1,250,615 | * | 1,250,615 | * | * | * |
| 1904 | 1,024,353 | ..... | 1,024,353 | 9,732,946 | 2,618,670 | 12,351,616 |
| 1905 | 1,038,705 | ..... | 1,038,705 | 9,780,584 | 2,767,580 | 12,548,164 |
| 1906 | 914,561 | ..... | 914,561 | 11,371,079 | 3,314,848 | 14,685,927 |
| 1907 | 1,508,492 | ..... | 1,508,492 | 12,500,000† | 3,500,000† | 16,000,000 |

* Lack of Data.
† Estimated.

COMPARATIVE RECEIPTS AND SHIPMENTS BY LAKE AND RAIL FOR CHICAGO-SOUTH CHICAGO.

CORN (Bushels).
Chicago Board of Trade Reports, Including Canadian Trade.

| | CHICAGO-SOUTH CHICAGO | | | | | |
|---|---|---|---|---|---|---|
| | By Lake | | | By Rail | | |
| Years | Receipts | Shipments | Total | Receipts | Shipments | Total |
| 1886 | ..... | 40,956,177 | 40,956,177 | 60,996,744 | 15,297,762 | 76,294,506 |
| 1887 | ..... | 38,710,856 | 38,710,856 | 49,670,345 | 11,734,628 | 61,404,973 |
| 1888 | ..... | 47,759,708 | 47,759,708 | 73,120,968 | 21,686,017 | 94,807,005 |
| 1889 | 500 | 63,200,754 | 63,201,254 | 78,197,970 | 20,655,269 | 98,853,239 |
| 1890 | 150 | 57,255,466 | 57,255,616 | 89,678,110 | 33,300,643 | 122,978,753 |
| 1891 | ..... | 40,069,786 | 40,069,786 | 71,674,777 | 26,508,514 | 98,183,291 |
| 1892 | 27,000 | 43,920,570 | 43,947,570 | 77,463,095 | 22,083,019 | 99,546,114 |
| 1893 | ..... | 62,967,955 | 62,967,955 | 90,014,341 | 15,942,824 | 105,957,165 |
| 1894 | ..... | 37,148,717 | 37,148,717 | 63,663,291 | 17,373,565 | 81,036,856 |
| 1895 | 200 | 47,857,550 | 47,857,750 | 58,322,391 | 12,075,715 | 70,398,106 |
| 1896 | 3,000 | 74,379,206 | 74,382,206 | 91,350,391 | 13,258,615 | 104,609,006 |
| 1897 | 7,300 | 85,250,760 | 85,258,060 | 114,981,069 | 12,171,496 | 127,152,565 |
| 1898 | 800 | 97,166,944 | 97,167,744 | 125,681,213 | 33,217,737 | 158,898,950 |
| 1899 | ..... | 62,399,727 | 62,399,727 | 132,126,233 | 54,142,369 | 186,268,602 |
| 1900 | ..... | 78,968,109 | 78,968,109 | 132,876,444 | 32,131,544 | 165,007,988 |
| 1901 | 1,500 | 33,833,732 | 33,835,232 | 84,131,137 | 30,268,141 | 114,399,278 |
| 1902 | 1,000 | 30,610,064 | 30,611,064 | 50,152,625 | 14,947,935 | 65,100,560 |
| 1903 | ..... | 68,093,622 | 68,093,622 | 98,545,534 | 21,085,493 | 119,631,027 |
| 1904 | ..... | 41,798,051 | 41,798,051 | 100,083,933 | 33,386,707 | 133,470,640 |
| 1905 | ..... | 49,772,146 | 49,772,146 | 110,496,642 | 41,381,196 | 151,877,838 |
| 1906 | ..... | 43,637,502 | 43,637,502 | 98,673,079 | 35,337,184 | 134,010,263 |
| 1907 | ..... | 46,604,412 | 46,604,412 | 124,996,232 | 49,166,367 | 174,162,599 |

## COMPARATIVE RECEIPTS AND SHIPMENTS BY LAKE AND RAIL FOR CHICAGO-SOUTH CHICAGO.

**WHEAT (Bushels).**
**Chicago Board of Trade Reports.**

| | CHICAGO-SOUTH CHICAGO | | | | | |
|---|---|---|---|---|---|---|
| | By Lake | | | By Rail | | |
| Years | Receipts | Shipments | Total | Receipts | Shipments | Total |
| 1886 | 29,361 | 10,513,126 | 10,542,487 | 16,730,032 | 4,475,774 | 21,205,806 |
| 1887 | 159,800 | 17,313,351 | 17,473,151 | 21,602,934 | 8,724,268 | 30,327,202 |
| 1888 | 60,500 | 5,895,379 | 5,955,879 | 13,280,425 | 5,612,880 | 18,893,305 |
| 1889 | ..... | 10,330,675 | 10,330,675 | 18,687,441 | 5,474,142 | 24,161,583 |
| 1890 | 187,599 | 6,965,834 | 7,153,433 | 13,976,299 | 4,540,843 | 18,517,142 |
| 1891 | 4,227 | 31,102,888 | 31,107,115 | 42,816,588 | 7,887,281 | 50,703,869 |
| 1892 | ..... | 33,498,547 | 33,498,547 | 50,189,805 | 9,926,930 | 60,116,744 |
| 1893 | 128,500 | 19,720,775 | 19,849,275 | 35,125,471 | 4,717,483 | 39,842,954 |
| 1894 | 526,511 | 15,016,804 | 15,543,315 | 25,120,516 | 2,509,442 | 27,629,958 |
| 1895 | 1,292,788 | 13,258,440 | 14,551,228 | 19,308,704 | 9,081,920 | 28,390,624 |
| 1896 | 4,480 | 13,232,818 | 13,237,298 | 19,921,562 | 12,183,084 | 32,104,646 |
| 1897 | 3,516,863 | 18,449,628 | 21,966,491 | 24,560,284 | 7,837,338 | 32,397,622 |
| 1898 | 1,598,100 | 26,594,263 | 28,192,363 | 34,109,356 | 10,882,449 | 44,991,805 |
| 1899 | 1,263,500 | 5,185,423 | 6,448,923 | 29,708,047 | 4,905,065 | 34,613,112 |
| 1900 | 550,848 | 26,577,243 | 27,128,091 | 47,478,230 | 9,829,149 | 57,307,399 |
| 1901 | 240,000 | 31,523,724 | 31,763,724 | 50,957,870 | 13,998,227 | 64,956,097 |
| 1902 | 1,969,241 | 22,028,580 | 23,997,821 | 35,971,712 | 8,190,227 | 44,161,939 |
| 1903 | 2,633,500 | 16,443,522 | 19,077,022 | 24,481,285 | 7,505,221 | 31,986,506 |
| 1904 | 495,000 | 5,627,386 | 6,122,386 | 23,954,747 | 11,947,020 | 35,901,767 |
| 1905 | 1,195,916 | 5,069,982 | 6,265,898 | 25,703,096 | 8,635,346 | 34,338,442 |
| 1906 | 785,415 | 9,138,655 | 9,924,070 | 27,464,060 | 7,488,410 | 34,952,470 |
| 1907 | 564,000 | 14,368,973 | 14,932,973 | 24,379,690 | 9,945,919 | 34,325,609 |

FREIGHT TONNAGES.
By Water.
Receipts and Shipments.

| Ports | | 1889 | 1890 | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 |
|---|---|---|---|---|---|---|---|---|---|
| CHICAGO | | 8,212,535 | 7,207,514 | 7,214,765 | 8,412,992 | 7,958,963 | 7,209,236 | 7,205,942 | 6,347,163 |
| SOUTH CHICAGO | | 753,599 | 1,796,401 | 2,066,751 | 1,822,907 | 903,379 | 1,436,897 | 2,857,750 | 2,973,724 |
| MILWAUKEE | | ..... | 2,362,052 | 2,916,478 | 3,020,471 | 2,661,827 | 2,879,605 | 3,096,055 | 3,446,628 |
| DULUTH | | ..... | 1,353,287 | 1,876,885 | 2,508,452 | 3,061,942 | 3,228,392 | 3,748,070 | 4,891,766 |
| CLEVELAND | | ..... | ..... | 4,512,765 | 7,060,791 | 4,189,922 | 4,043,804 | 5,252,599 | 5,522,111 |
| LUDINGTON | | 309,014 | 359,699 | 281,186 | 546,217 | 435,951 | 704,315 | 720,920 | 875,697 |

| Ports | 1897 | 1898 | 1899 | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CHICAGO | 7,149,759 | 7,391,454 | 6,189,365 | 5,873,070 | 6,184,242 | 5,184,792 | 6,105,553 | 4,446,071 | 5,383,986 | 5,011,786 | 4,980,123 |
| S. CHICAGO | 3,493,213 | 4,117,526 | 3,229,874 | 3,783,674 | 3,995,277 | 4,454,428 | 4,742,225 | 3,728,260 | 4,530,394 | 5,290,326 | 6,430,347 |
| MILWAUKEE | 3,750,346 | 3,787,545 | 3,662,786 | 3,703,240 | 4,037,597 | 3,594,122 | 5,071,768 | 5,406,547 | 5,454,347 | 6,204,024 | ..... |
| DULUTH | 4,776,080 | 5,932,818 | 7,230,206 | 7,089,441 | 5,816,583 | 9,175,593 | 9,002,530 | 8,024,319 | 13,139,541 | 16,518,200 | 19,635,809 |
| CLEVELAND | 6,118,731 | 6,500,518 | 7,390,921 | 7,569,423 | 7,484,810 | 10,151,006 | 10,050,433 | 9,350,417 | 11,419,797 | 12,247,626 | ..... |
| LUDINGTON | 952,604 | 1,453,796 | 875,730 | 1,054,672 | 1,126,003 | 1,341,712 | 1,362,858 | 1,631,741 | 1,497,558 | 1,497,424 | 1,870,720 |

From Commercial Statistics of the United States Engineers' Reports.

## INCREASE OR DECREASE OF COMMERCE. 1907 COMPARED WITH 1901.
### Receipts and Shipments.

| Ports | Hard Coal (Tons) | | Soft Coal (Tons) | | Flour (Tons) | | Wheat (Bushels) | |
|---|---|---|---|---|---|---|---|---|
| | Increase | Decrease | Increase | Decrease | Increase | Decrease | Increase | Decrease |
| CHICAGO-SO. CHICAGO | 5,540 | ..... | 361,522 | ..... | 177,192 | ..... | ..... | 12,275,371 |
| CLEVELAND | ..... | 2,441 | 1,844,584 | ..... | ..... | 1,787 | ..... | 62,579 |
| DULUTH | ..... | 120,694 | 1,059,458 | ..... | ..... | 136,115 | 8,567,683 | ..... |
| MILWAUKEE | 64,875 | ..... | 2,319,955 | ..... | 9,960 | ..... | 1,918,881 | ..... |

| Ports | Corn (Bushels) | | Oats (Bushels) | | Barley (Bushels) | | Rye (Bushels) | |
|---|---|---|---|---|---|---|---|---|
| | Increase | Decrease | Increase | Decrease | Increase | Decrease | Increase | Decrease |
| CHICAGO-SO. CHICAGO | 14,913,827 | ..... | ..... | 4,714,560 | ..... | 274,064 | 320,998 | ..... |
| CLEVELAND | ..... | 136,100 | 742,271 | ..... | 173,500 | ..... | ..... | 6,135 |
| DULUTH | ..... | 654,650 | 711,674 | ..... | ..... | 95,500 | 44,075 | ..... |
| MILWAUKEE | 494,726 | ..... | ..... | 547,787 | ..... | 129,723 | 201,101 | ..... |

| Ports | Iron Ore (Gross Tons) | | Iron, Pig (Gross Tons) | | Iron Mfrs. (Gross Tons) | | Salt (Tons) | |
|---|---|---|---|---|---|---|---|---|
| | Increase | Decrease | Increase | Decrease | Increase | Decrease | Increase | Decrease |
| CHICAGO-SO. CHICAGO | 1,914,487 | ..... | ..... | 13,240 | 32,866 | ..... | ..... | 155,481 |
| CLEVELAND | 3,043,451 | ..... | ..... | 19,679 | 142,569 | ..... | ..... | 10,425 |
| DULUTH | 9,987,966 | ..... | ..... | 30,060 | 86,595 | ..... | 8,941 | ..... |
| MILWAUKEE | 17,102 | ..... | 19,729 | ..... | ..... | 19,544 | ..... | 7,856 |

| Ports | Copper (Gross Tons) | | Logs (M. Feet) | | Lumber (M. Feet) | | Unclassed (Tons) | |
|---|---|---|---|---|---|---|---|---|
| | Increase | Decrease | Increase | Decrease | Increase | Decrease | Increase | Decrease |
| CHICAGO-SO. CHICAGO | ..... | 20,359 | 802 | ..... | ..... | 342,811 | 268,339 | ..... |
| CLEVELAND | ..... | 1,225 | ..... | 2,322 | ..... | 206,061 | 218,386 | ..... |
| DULUTH | ..... | 18,348 | ..... | 34,157 | ..... | 56,811 | 434,630 | ..... |
| MILWAUKEE | ..... | 1,450 | 85 | ..... | ..... | 42,162 | 622,497 | ..... |

# Appendix E

## Digest of Hearings Before the Chicago Harbor Commission

W. H. BIXBY,
Lieut. Col. Corps of Engineers, U. S. A.

The functions of the War Department and the Engineer's Department as to navigable waters of the United States, especially as they refer here to Chicago, are not always understood by the general public, and sometimes not even understood fully by the boat men, the river men and the business men of the city. They are mainly conservative and protective. They are only incidentally constructive. The main duty of the War Department in such matters is to safeguard naturally useful waterways from being abandoned or destroyed or used for some other purposes, and to improve them, where necessary, by dredging, by locks and dams, and breakwaters and anything of that sort.

Now, it is not specially the business of the War Department to show how a harbor can be built or how piers can be arranged for navigation, unless there is some special act of Congress that calls for that. Until they do call for it, there is some doubt as to whether we are at liberty to specify anything in particular. But the function of the War Department is to see specially that the area useful for such purposes are preserved, so as to retain their navigable uses, to retain their potentiality so that they can be used in such a way later on.

It is not specially the business of the War Department to find ways to transfer cargoes from boats to railroads or factories, stores, residences and vice versa, when they are making provision for a harbor, but to see that when some good man or business organization does come round and finds out and is ready to do so in a proper way and effective way that they shall not find the navigable waters that they want to use already filled up so that they are useless for their purpose.

The act of March 3, 1899, under which the War Department now acts to prevent or remove obstructions to navigation, does not allow the Secretary of War to authorize the construction of anything, but it simply obliges him and gives him the power to remove obstructions that are in the way of such constructions when the latter can assist navigation and commerce. And it gives him the power to stop the construction of anything which interferes with navigation or is liable to interfere with navigation. His power is rather prohibitive than otherwise, and a good many people have an idea that if they get permission from the Secretary of War to do something in the way of a wharf on the lake front that they do not have to go to the state or city or any other authority for permission, but they can go ahead and do it. That is a great mistake. If the Secretary of War does authorize something in the

form of a permit that seems to give authority, he uses that phraseology at the head of his permit just because it is the form that is used in the act. Then he is obliged to put in at the end of the permit a little clause that says that this permit does not give authority to do anything that is in conflict with any other laws, and does not give the right to a man to infringe on his neighbor or to do anything that the law properly does not otherwise allow him to do. In other words, the Secretary of War permit is simply a waiver of objection on the part of the War Department to constructing something which some one else wants to have, and is given on the supposition either that he has a right to go ahead with it under the state laws, or else he will get those rights before he takes advantage of the permit.

Chicago is not going to realize what are the possibilities of lake navigation unless her people look at other places and take into consideration the changes that occur elsewhere. Right here at the harbor, commerce has been struggling along very peculiarly for a longe while. In 1867 it was a good harbor, a first-rate one, and suited all the boats that navigated the lakes, but the engineer officer in charge here, who was my professor at the military academy, saw and stated then he did not believe the Chicago river could ever hold its own with the development of commerce, and a special board of engineers was ordered in Washington to come here, and they looked it over and reported back in 1867 that the Chicago river could not take care properly in the future of the commerce that ought to come to Chicago, and they said the only salvation then was to put a breakwater outside the harbor and make provision for piers and wharves out there. That was the origin of the breakwater outside the Chicago river, and when they put the breakwater in front of Grant Park originally, it was with the expectation that those piers and docks of the Illinois Central Railroad would be gradually extended down southward, and just as fast as boats wanted docks they would build them and they would all be under the protection of the breakwater, and after all the ground behind the original breakwater had been used up, they expected to extend the breakwater south, but they didn't exactly know how the conditions that obtained in the deed of donation of Grant Park to the public held, and while a good many people in that day expected to see Grant Park used for piers and wharves, they found that it was not possible to do it under the conditions of the law, and that no matter whether they wanted them or not, they could not have them there, and under the conditions of the deed they could not then have any buildings there for commercial or business purposes, and there was no use having piers and docks if they could not have any buildings, so they never got there. Therefore, that breakwater has stood there without being used, and it has never had a fair show, and that part of the outer harbor of Chicago never has been properly tested, and you don't know what it might have done if it had been given an opportunity. I am not arguing today that it is a desirable thing to put that front of Grant Park into piers and wharves, because the park is there in good faith, and it is started, and it has got so far along that it would seem a shame to do anything else with it but keep it for a park; and the park is a grand, good thing in this neighborhood. But just because the

park occupies a portion of the lake front, because it is there and because it is useful for other purposes, because it is pleasant as a park is no reason why they should necessarily sacrifice all the rest of the lake front harbor.

Every engineering officer who has been in the district since 1867 and who came to it from other districts where they have had other boats and other harbors in front of them has sided with that original board, and has felt that if the Chicago river ever could in the future take care of the commerce that ought to come to it—if there ever was to be a good harbor in Chicago, one which could expand with the city—it would have to go out in the lake.

As I say, in 1867 Chicago was comparatively an infant. The boats were small, the river was small, all like the city, and all adapted to each other. But Chicago is well grown now and is going ahead remarkably fast; the boats are getting larger every day and the mass of lake commerce is going into big boats, because a small boat cannot compete with the big one when it comes to freight rates. And the river has not grown, and after looking at it carefully for two years, I don't see how it can grow in proportion to the growth of the city of Chicago. Chicago's commerce, even including the Calumet, has not grown as rapidly as other Great Lakes harbors, and is steadily losing ground. As the Chicago river has lost, the Calumet has gained, but the sum total has practically stood still for the last ten years. Some years it goes up, and some years it goes down, but it is just about the same as it was eight or nine years ago. And, anyhow, whether it has gained a little bit or lost a little bit any particular year, it has not grown as rapidly as the other lake harbors have. All these other lake harbors have been booming along, making two or three or four million in the last ten years, and that is a very large proportion of what they had ten years ago, and when you come to plat their commerce on a chart you will find a very steep slope of all the harbors that ever amounted to anything. Milwaukee is going ahead very much faster, has a greater proportion of gain every year in percentage than Chicago has, even when you count Calumet in.

Now, the fact is, as I say, that Chicago is losing ground to all the other lake ports, and Milwaukee is gaining in tonnage very much more rapidly each year than Chicago.

The cry in 1899 was that the river was not deep enough. The cry from 1899 to 1906 was tunnels in the river. Now the cry must be the wrong style of bridges, and in a few years, like 1911 or so, the cry will be not that the bridges are a wrong type, but the number of bridges and the narrowness and crookedness of the river, the interference of the current and the interference of boats tied up. The last named conditions are not going to be any better.

Now, right in that connection I will say that I have had people in the last year or two come to me from up the west shore of Lake Michigan interested in the lake shore navigation, coastwise navigation, and say they wanted to get up into the south branch of the Chicago river, but they could not do it. They said, "Can't you do something for us? Why, we can't get in there and unload and load up in the same day. It

is not possible, and we have got only a small boat. We get in in the morning, and the first thing there are the bridges closed against us from six-thirty to eight-thirty; then we stand around and wait for them to open. When they open we get up the river and by the time we are unloaded and loaded up and get back again it is half-past five in the evening, and then the bridges are closed again another two hours. Then by that time the crew strikes and says, 'We are not going to work nights without double wages, and you can give us double wages or get another crew.'" And if that thing cannot be remedied in some way the only thing they can do is to get out of business and go somewhere else. They cannot go to Chicago. I have not been able to help them in the least. Neither has any river man I have talked to been able to help them. All he can do is to look and say, "That is the way I have talked for several years, but I have not been able to get any sympathy for several years." Now, Mr. Cooley says, I was told on good authority, several years ago, and I understand he still says, that the Chicago river ought to be three hundred feet wide. I thoroughly agree with him, except I say three hundred feet would not be much use, and it will need eight hundred feet if you are going to have slips on one side of the river, and fourteen hundred feet if you are to have slips on both sides of the river, and then the slips you get will only take care of about two boats, because they will have to reach from street to street in order to let the boats turn around the corner and get in, and then it has got to be two city blocks deep in order to be long enough for a boat to lie there without sticking out and blocking the channel, and so you have got to have five or six hundred feet on one side for two boats and five or six hundred feet on the other, and you have taken up two city blocks to do it for four boats and a distance of from one street to another. Now, Mr. Randolph can probably tell me whether I am correct in my understanding that the Sanitary District had to pay as high as five dollars per square foot for the land it got.

Mr. Randolph—As high as eleven dollars and something.

Col. Bixby—I took the report of the Sanitary District last year and averaged up all the land I could get track of, and my figuring was that in order to widen the river to two hundred feet, which was absolutely necessary, the price averaged five dollars a square foot for the land. Now, two city strips at five dollars a square foot is two hundred and forty thousand dollars an acre, or one hundred and twenty-five million dollars a square mile, something that ought to impress any man, even in Chicago, and one of those slips that just accommodates two boats between one slip and another, and going back five hundred feet is going to take in about three hundred times five hundred feet in square area—that is one hundred and fifty thousand square feet—and is going to cost three-quarters of a million dollars or a million dollars, just to accommodate two boats on one side of the river in the Chicago river for wharfage purposes. Now, I do not believe that anybody is going to rent out land or buy land in Chicago at that rate for two boats to wharf at. They are not willing to pay half a million dollars for land to wharf one boat at. But they have got to do it if they are going to use the Chicago river for the first four or five miles up either the south branch

or the north branch. Of course, when they get down beyond Robey street into the Sanitary District, the Sanitary District has a splendid harbor down there. I have not a word to say against it. It is going to be one of the most valuable assets of the city of Chicago, but the only drawback to it is that a boat has got to get there. It has got to go under something like twenty-five bridges; it has got to look out ahead and go slow so as not to go into boats tied up at the wharves, and it has got to stem the current one way or another when it comes out—a current that must necessarily be there for the next fifty years anyhow, perhaps forever for drainage purposes—because the use of the river for drainage purposes is an established fact. It has cost money and is there, and is going to stay there. Personally, I don't believe that it eventually will do for Chicago all that its projectors hope for it, but so much of it as is there today I don't think you will ever see come out for the next fifty or a hundred years, and therefore you have to accept it as a fact and use your river accordingly. Don't expect your river to do anything more for you in the harbor way for the first five or six miles from the mouth than it can do under the circumstances.

There is another feature, while I am on the harborage of Chicago—the Chicago river affects the entire Great Lakes system. The interests of all other harbors on the Great Lakes are entitled to a great deal of consideration in anything that is done in the Chicago river. So long as the only action in progress is that of using Lake Michigan's navigable waters for purposes of navigation and commerce, I don't have much to do in my office except look on and assist when necessary and await developments. But when any one commences to destroy navigation possibilities it is my business to protest and to make reports to Washington and take any other action as seems proper.

My action is protective and safeguarding. The War Department holds every engineer in charge of districts responsible for protecting and safeguarding navigation needs of the general public. That includes the commerce of the Great Lakes that wants to come to Chicago, just as much as the commerce of Chicago itself that does not get outside Lake Michigan. And that department holds him responsible for protecting all these navigation interests in the individual cases actually in progress and in safeguarding them from matters not actually commenced, but liable to come up.

Since I came here three years ago certain parties came to my office with a statement that they wanted to establish wharves on the lake front at various places; they wanted to build out into the lake for commercial and business purposes. One of the first places was between the Indiana state line and the Calumet river. I naturally told them the War Department might not object, but they must go to the state for the actual right to build; and then they told me that no wharf could be legal under the circumstances. There was not any state law that allowed construction of a legal wharf for commercial purposes anywhere on the Illinois shore. And furthermore, the Park Commission objected to their doing any work in that vicinity, because they wanted it for a park. I heard recently that it was quite possible that the Park Commissioners might not want to use that. But still nobody has been able

to use it, and everybody else who has wanted to do business commercially on that lake front has had to stay away while the Park Commission is making up its mind whether it wants to put a park there or does not. Since then other parties have endeavored to get state authority for wharves along the lake front, but without success. When I came to look around I found there was not a foot of frontage on the lake from Wisconsin down to Indiana where a man could erect a legal wharf. He could put it up at his own risk and take his chances on taking it down, but if any one protested sufficiently hard he would be enjoined and the wharf taken out. He could not fill in anything. He could not build a wharf for any commercial business. But I found that the Park Commissioners under the act of May 14, 1903, could occupy the shores to the exclusion of any one else from the Indiana state line to about 95th street; then skip the Calumet river front and the Illinois Steel Company's property, and they could then go from north of the Illinois Steel Company's property, about 79th street, up to Jackson Park. You see, they were already occupying Jackson Park. Then from Jackson Park up to Grant Park there was a place that no one was doing anything, and the Park Commissioners did not have any special act authorizing them to step in there. But Grant Park, of course, was occupied and has been for fifty or sixty years. Then came the Michigan Central Railroad piers, which have been there from olden days, but they could not spread them out anywhere or do anything else with them. And then when you get north of that and get to Indiana avenue, from there to Lincoln Park is boulevard, that the park controls. Then comes Lincoln Park, and beyond that they have state authority under an old law to go from Lincoln Park to Lawrence avenue, and to that extent they have had the authority and permission of the Secretary of War. Then their state authority authorized them to extend all the way up to Devon avenue. The law allows them to go to Devon avenue, the old law. Now, this present law comes in and, of course, allows them to go anywhere. Nobody else can get anywhere, but they can get everywhere there is not a wharf already built that is legal.

Although Grant Park has a breakwater in front of it and a basin between the shore and the breakwater in which boats can lie, it is impossible to make any use of these premises for commercial purposes. This gives over thirteen miles of city front dedicated to park purposes and practically the only length that is left available for lake harbor is five or six miles between Grant Park and Jackson Park. That is everything that is left. Now, if this were to be used, that is the only thing that is left for your next fifty or sixty years.

Now, if there were to be a harbor—if that place from Grant Park down were ever to be used for a harbor—it would be natural to expect the general government to build a breakwater out there, and if a breakwater were built out there it would be built in about thirty feet of water, which would put it about a mile from shore, so that it would be practical to put in anything that was wanted, slips and docks, and make any arrangement so that boats could pass behind that into the Chicago river. It would be practical to allow one thousand feet width of strip

along the shore next to the Illinois Central to be used for track accommodation of all the railroads in the city that might desire to reach these piers and slips. There would be room enough in this area for nearly every railroad in the city to build its own piers and docks enough to take care of its share of the general commerce or for a corporation, a docks corporation, to go in there and do it, or even the city itself could go in and establish a dock organization that would be available for all railroads and other transportation companies. They could do as has been done in Galveston—put it in the hands of all the companies and request them to give the use of free wharfage in return to every railroad that comes into the city. That is the Galveston plan. So that no railroad shall be unfairly treated and every railroad shall have its chance and no cars shall be tied up on one road any more than on another. But those are details, of course, that do not concern the War Department in any way. I speak of them merely as possibilities because that makes the place a possibility for harbor purposes, and a very serious possibility and a very valuable possibility, and the land that is out there is worth just as much to the city of Chicago as land that is inside after they once get their general arrangements made so that the roads can get to them and boats can get to them. Now, boats of all sizes could run right in there, the biggest on the lakes, no matter how big, if they get to be eight or nine hundred feet long, they could get in there. But the six hundred foot boats of today, lots of which are being built, more of them built than anything else today, a good many built every year on the Calumet, could go in there and unload immediately and get away, and goods could be put into barges and lighters and go up the river under the bridges, or they could go on to surface tracks or into carts, if you want carts. They could get on the rail in underground tunnels or on the elevated railroad or any other way that could be invented to get them away. There would be a chance to do something.

The first difficulty is the bridges. There are over twenty-five bridges now between here and the drainage district harbor, and every bridge means a good deal of delay to a boat. It does not take a boat very long to get by one bridge if it hasn't anything else to do but get by that bridge and the bridge is ready. I have seen a boat go by the State street bridge in three minutes, and I have seen a boat take fifteen minutes to go by one bridge. If the boat is alone, it can go by quickly, but if there is another boat near it, it has to go slow. If it comes to a corner of the river, it has to slack down very greatly or it will run into some boat tied up at the wharf, and if the bridges come every street, then the boat is not out of one bridge before it is into another, and where the bridges are at every street one of the modern boats would have its bow in one draw and its stern in another open draw, while the middle of the boat was in a third, and it would have to have three bridge draws open at once. Now, when that boat has got to pass another boat, it would have to pass it somewhere around a bridge or have to go up till it found a place where there wasn't a bridge, and every other boat would have to stay out and they could take half an hour or an hour to get up one mile. See what that boat is going to do if it wants to tie up at a wharf. Even a four hundred foot boat cannot tie up at a wharf

where the bridges come every street, and in the main river there is a bridge at nearly every street.

You cannot have a boat going through a bascule bridge at one end and around a center pier of a bridge like that at Wells street at the other. It has got to have a hinge in it somewhere or be made of rubber before it can get around those corners.

Then the closed hours. Two hours every morning and two every evening from the Lake to Kinzie street and from the Lake down to 12th street, and one hour in the morning and one hour in the evening for every other bridge in the city. There have come into my office representatives of surface travel interests who said that what the real estate men of Chicago wanted—I don't blame them—was that the bridges over the river should be tied down absolutely so that they never could be lifted and nothing could go up the river that did not go under the bridges, and if they could not get that, they wanted the two hours made three hours in the morning and in the evening.

Now, the current in the river. Of course, there must be a current with a drainage system, and as I say, the current that is there today must always stay there. It never will be less than it is today. It is possible it may be twice or three times as great. It will probably be nearly twice as great if all the water that is taken through under the ten thousand cubic foot per second rule goes through. There may be arrangements to cut some of that down, but I don't think any one can expect there will be any less current than there is today. Today it does not bother us so very much because the boats are small, but no big boat has got up there to see what will happen. But if a big boat should get up the river anywhere in the neighborhood of Robey street and ever turn around and go into a slip, if it could find one that was wide enough at the mouth to let it turn the corner and get in, before the center of the boat got in the end of the slip the stern of the boat would be on the other side of the stream and running against the pier, and then the whole river would be closed up down to the full draft of the boat, which should be fourteen to nineteen feet, and all the water which goes down the river under the drainage district methods would have to go between the bottom of that boat and the bed of the river. It is not going to be the least difficult to get up currents of six or seven feet a second, or perhaps a good deal more.

I brought over with me a map of the river that I have shown many times, and want to show to you to emphasize the points that I have made about the river. I have claimed, and I claim still, that the river never can be a decent and respectable harbor for the city of Chicago. It can be a magnificent through line of travel to the harbor of the Sanitary District. It can be a magnificent through line of travel to the Mississippi waterway if we get a seventeen or twenty foot way, but before it is that it cannot be used for wharfage unless it is used for just wharfage by lighter, and it cannot be used by boats unless they are all light boats like steam tugs pulling lighters that can race by under the bridges at the time that the overhead travel is using the bridge. In other words, they can go through the river at times when the big boats can't go. But the big boats will need all the time that the bridges can

let them through if the Sanitary District harbor is ever going to amount to anything, which I hope it will, and if the fourteen-foot waterway ever amounts to a row of pins, which I hope it will.

From my point of view, looking at the experience on the Detroit river, if the Sanitary District canal harborage down there is just simply occupied reasonably as it ought to be, and letting each boat stay four or five days and take four or five days to get in the harbor and tie up there and get out of there, and if it is just occupied all the available hours of the day that can be used for open bridges, it would be occupied by just the boats that are going into the harbor and are going out again. There would not be any room for the Mississippi travel, and there would not be any room for any small boat travel that wants to go to any wharf, and they could not occupy wharves unless they were small barges with lighters instead of small boats.

Mr. Conover—Why do they put the abutments of the bridges in the river instead of having them even with the shore line?

Col. Bixby—I can tell you just why, gentlemen. We will take the illustration of the new Northwestern bridge, the Kinzie street bridge and the Milwaukee & St. Paul bridge. I came here and found my predecessor had fought for two or three years to have bridge draws with a hundred and twenty-eight feet clear span, and he could not find any of the river men to back him up. And when I came here I stuck up for the hundred and twenty-eight foot span, and I made up my mind they were going to have a hundred and twenty-eight foot span there, because they need it for the bridge, and I believe they would have got one hundred and twenty-eight feet next year if I had been let alone. But the river men came up and were disheartened and said, "We have been fighting for years for a chance to get up into this river and everybody is against us. All the surface travel is against us. As far as we can see, the city council is against us," and so they went down and put on paper a writing on the part of the Chicago River Improvement Association begging the Secretary of War to allow the bridge to go in there with ninety feet span, because the railroads and the city had agreed if they would do that to put the bridge in in two years. Just a little bit further on here at this street, between Wells and Lake, the Orleans bridge, they came up first with the smallest span, and the boat men came in and made a protest and there were about four people in the room to represent the boat interests, and it was a room twice as big as this and jammed full of surface travel people, who said they were going to have that bridge in spite of anything, and I did protest and object, and I finally got the city to make the span some twenty feet more than they wanted to do. They did not like to do it, because it was going to add so greatly to the expense and they didn't feel they ought to, but they did.

Mr. Delano—Colonel, if a hundred and forty feet is the right span, right opening in the straight part of the river, it seems almost self-evident that on a bend like that at Dearborn street you should have a bigger opening.

Col. Bixby—That is the reason I made them put in two hundred feet there. That is just the reason.

Mr. Delano—But State street is only a hundred and forty feet.

Col. Bixby—I did not have anything to do with it.

Mr. Randolph—State street is a hundred and forty feet.

Mr. Wacker—I knew nothing about the difficulties there at all, but I have asked the question time and again why the abutments were run into the river to the extent that they have been, and this is the first time that I have heard it explained. I never could see any reason for it. It seems it is a question of dollars and cents, and at a vital point at that.

Mr. Delano—I would like to ask a question which has occurred to me. Has anything occurred to you in favor of or against any alternative outlet? As it appears to a man looking at the map, the Drainage Canal is a straight line from the point near the lake. Now, is there any way by which you can get from the Drainage Canal to the lake at any other point, at, say, the bend up here between 12th and 22d street, or down connecting with the stockyards ditch, 39th street, or through the Sag? Is there anything to be said in favor of any such alternative route from an engineering standpoint?

Col. Bixby—Well, Major Marshall took the ground that for the purpose of the through travel from the lake to the Mississippi, to the Illinois river, the proper place for the route was by the Calumet, because all the big boats that went through there would not be obliged to trail through the city of Chicago, and they would not be obliged to stop the surface travel of the trains going in and out of the loop, and all that sort of thing. But he has not forgotten to this day the way the city of Chicago sat down on him, and he always thinks of the city of Chicago as not having given serious weight to his views as a mere question of navigation.

Now, as a mere question of through travel of boats, I say without question that I would stick right by his views, and his views are just as sound today as then. But you gentlemen have got in front of you a good many other things besides pure navigation. You have got your Sanitary District on your hands; you have got to work that in connection with the other. It would be a splendid place from my point of view to put a cut through from 16th street for barges and lighters, and put fixed bridges and let every tug and lighter go right straight from the lake and connect with the river, but that would interfere with the sewer, probably. It would interfere with gas mains and all those things. I don't see how it would interfere with the underground transportation company's tunnels, because I think they are too far down, but it would never do in the world, so far as I can see, from the objections that have always been raised heretofore to anything in the nature of bridges—it would never do for any man to attempt to put a line of canal through there that was going to allow movable bridges for great big boats with masts to go through unless he was prepared to tie up three-quarters of the surface travel of the city of Chicago. They would all be down on him. The fights we had over the Orleans street bridge would be like the buzzing of a fly to an artillery fight, just about. If you can do it and put it through, and find enough people to agree on a navigation point of view, it would be excellent. That is about the best place to get the cut through, the shortest. These things have been pretty well dis-

cussed and the pros and cons have been weighed, as Mr. Randolph says, about 1901.

The position of the engineer's department is that that would be favorable to navigation, therefore the engineering department or the engineering office is not going to use its influence one way or the other. The engineering officers are going to sit back there and let the other men fight it out. Of course, it would be favorable to navigation, but he doubts whether you would be able to arrange it.

Now, take the scheme for the Calumet. The War Department has never made the slightest objection that I know of—the papers all went through my office—never made the slightest objection to a canal through there for navigation purposes, because it thinks it would be a great aid to navigation. I assume from the start, the main objection to it was that the Sanitary District funds could not be spent for creating canals for navigation purposes or some such other technicality, and just what the reasons are I don't know, but the mere navigable feature of it I think the War Department has always attended to, and always would attend to, but it is not going to attempt to dictate to anybody. Its only legal function is to say what you cannot do, because it would interfere with navigation, but when it helps navigation they simply sit back and say, "We have no objection."

Chicago needs some kind of a harbor equipped to handle goods, so that it will attract shipping instead of doing some of the things we have done to drive it away; and if that is done, I think we will be astonished at the results. We have no such a place now and we cannot possibly have on the Chicago river. I can name at least four reasons, any one of which is sufficient to dispose of that subject. It is impossible to do it in the first place, because you cannot take a ship into the Chicago river, that is, one of our modern fleet. Now, our aim has been to get a bridge at every street to relieve the congestion, and that will bring a bridge about every three hundred feet and a ship six hundred feet long would keep three bridges open at the same time, and if she is in motion it would probably take four; and would practically cut off transportation in Chicago between the North and South sides. Now, I am told it takes six to eight hours for a boat to get to the turning basin on the South Side when the active season of navigation is open, and another thing is that one of those long boats would have to become a snake to make some of the turns necessary in the Chicago river to escape the bridges.

Another reason why you can't use the Chicago river for a harbor is that there is a current in it. One of the most experienced river men here told me recently that he had tried to get a third vessel past when there were two, one on each side, and when he got the vessel in a little way she stuck and before he got through he had to get six tugs, and it was necessary to have the controlling works shut down.

Now, there are two reasons which in my judgment are sufficient to prevent us from making a harbor out of the Chicago river, and supposing it was practical, is there any place in the Chicago river up to Belmont avenue that one of those large ships could dock?

Now, with the harbor located at the mouth of the river, in my judgment the Chicago river frontage will be worth a great deal more

money the moment it becomes known, on account of the fact that the barge will become a very familiar sight and something that is practically unknown in this country. In the old countries, especially on the North Sea, they use barges that are of a peculiar construction—a steel double bottom adjusted by their own power, so that they can make a dock anywhere. They will do an enormous business, so that our river property will be worth a great deal more if we build a commercial harbor than it ever has before. These things seem so clear to me that I hardly think it is worth while to try to make a harbor out of either the Chicago or Calumet rivers. With the connection between these two rivers we will have nearly one hundred miles of barge service instead of building canals as the European countries have to do. We now have eighty-six miles of barge service in the Chicago and Calumet rivers, and we can connect the two systems at a point near Summit.

The question is, where should the harbor be placed, if it cannot be placed in these rivers? The Illinois shore is limited. In fact, we have no place to put the harbor that will do the work entirely except in the center of the city, as near as possible with approaches for all the railroads.

[From this point on the discussion centered about a map with a plan for an outer harbor at the mouth of the Chicago river, and at 22d street.]

## MR. C. E. KREMER.

I will say that I am speaking now entirely for myself and as a citizen of Chicago of thirty-three years' residence. During that time I have been connected with the lake marine, practicing maritime law in the courts; a vessel owner, founder of the Chicago Yacht Club, president of several transportation companies and the director of certain others; vice-president of the Merchant Marine League, and in every way connected as closely as a man can be with shipping and the lake marine. But I voice my own sentiment and my own ideas and my own opinions at this time. I represent no association, but entirely and solely myself, although I believe that what I say will be indorsed perhaps as a whole or at least mainly by all the men that are familiar with the lake marine shipping of Chicago both in the past and at the present time.

Mr. Kremer discussed the change in the type of lake vessels in the last twenty-five years, analyzed the grain, lumber and coal traffic and expressed the opinion that the prospect for an increase in trade in these commodities is not encouraging. Proceeding, he said:

We will now take up the line boats. Of these we have seven lines running to Chicago, one each from Canada, Ogdensburg and Duluth and the remainder from Buffalo. In the last twenty-five years the line boats have been increased somewhat in number, but practically doubled in carrying capacity, and the docking facilities of Chicago are far from such as best accommodate and facilitate the business of this class of steamers. Most of them have a central wharf in the Chicago river, at which some merchandise is discharged, and the remainder of the cargo is discharged at different railroad docks along the river. The cargoes of these steamers, consisting of bulk grain, flour and general mer-

chandise, is also taken from the elevators, railroad and other warehouses and docks, up the river, as well as from the central dock of the transportation company. Lighters on the river also operate in conjunction with these line steamers.

The time, I believe, is coming when additional wharfing facilities for this class of steamers must be provided. The projected bridges at La Salle and Franklin streets will further reduce the docking facilities, because they reduce the length of the dock space, so that there will not be room enough between bridges for the longer modern steamer.

The passenger business has increased very much more than the freight traffic, and it is fair to say that the number of passengers carried on the lake vessels in and out of Chicago has increased six or seven fold during the last twenty-five years, and I am of the opinion, from inquiries I have made, and what I know about the business of this class of steamers, that it will continue to increase.

We have running to Chicago the following lines: Goodrich Transportation Company, 9 steamers, Chicago to ports in Wisconsin and Michigan.

The Graham & Morton Transportation Company, 5 steamers, Chicago to Holland and St. Joseph.

Northern Michigan Transportation Company, 4 steamers, Chicago to Mackinac Island and intermediate points in Michigan.

The Dunkley-Williams Line, 5 steamers, between Chicago and South Haven.

The Barry Transportation Company, 2 steamers, between Chicago and Milwaukee.

The Indiana Transportation Company, 2 steamers, between Chicago and Michigan City.

The Hill Transportation Company, 2 steamers, between Chicago, Waukegan and Kenosha.

The present wharfing facilities for these passenger steamers are entirely inadequate, and in many places inconvenient and insufficient, and a large part of the inconvenience is suffered by the passengers themselves when about to embark and leave the steamers. Several of these steamers are used by a large number of passengers who make excursions to nearby lake ports, at times amounting to 15,000 a day.

I believe that this business is to increase as the population in Chicago and the cities about Lake Michigan increases, and the time will come when there will be no docks in the downtown district to accommodate these steamers, each succeeding one being larger and longer than the preceding one. We will soon have steamers that cannot find dock room between bridges on the main river above Rush street bridge. I think that these steamers should be accommodated at piers projecting out into the lake. Nearly all of them carry more or less package freight, both to and from Chicago, and some of them during the fruit season carry enormous cargoes of fresh fruit, which is taken on board in the afternoon at the Michigan ports and delivered in Chicago early the following morning, and then distributed throughout the city. The docks and warehouses are much too small now to accommodate this fruit

trade. I believe that these steamers could be better accommodated at piers on the north side of the river.

Between the river and Ohio street there is sufficient space in which to construct three piers, which would extend out into the lake parallel with the north pier for a distance of from 2,000 to 2,500 feet. These piers would be protected by the outer breakwater on the east and by an extension of the north pier on the south, and the northerly pier of the three would operate as a breakwater to protect ships in the slips between the piers from the sea on the north. If necessary, the present government breakwater could be extended westerly to further break the sea from the north, and this would make available the north side of the pier, which would be an extension of Ohio street.

These piers should be wide enough to accommodate at least one railroad track on each pier, if not two; also freight sheds or warehouses, and passenger stations of sufficient dimensions to care for in and out going freight and passengers. The piers might be 150 feet wide and the slips 200 feet.

My suggestion is to have all the passenger steamers land at and depart from these piers. The piers could be connected with the tracks of the Northwestern Railroad, and freight cars could be taken directly to and from these piers over this railroad. There could be a cross-town car line on Indiana street, intercepting the Wells, Clark and State street car lines, which would take passengers out to or directly on to these piers. In this way the piers would be more accessible than most of the passenger docks now are, both as to freight and passengers, and they would be near to each other. The steamers could come and go promptly without being delayed by bridges, currents or other steamers as they are now in the crowded Chicago river, and much time in the departure and arrival could be saved in this way.

These piers, presenting a dock frontage of 12,000 feet (having each pier 2,000 feet long), would give ample dock room for all time. At present these passenger steamers use a dock frontage of only about 2,000 feet, but are much crowded and inconvenienced.

These piers would be a great improvement over the present dock facilities and would not disfigure or injure the appearance of the lake front at that point.

For the accommodation of the package freight steamers, if they could not be accommodated at piers on the north side, I would have the city extend a number of piers out into the lake from the Illinois Central slips between the river and Randolph street. These piers could be longer than those on the north side, because the breakwater now on the north side, while seven-eighths of a mile from the harbor piers, runs in a northwesterly direction toward the shore, and thereby shortens the distance between it and the shore as you go north. An outer breakwater could be extended south in front of these piers, the south pier being extended east to join it. Have in it an opening such as there now is, into the basin inside of the present breakwater. These south side piers could easily be 4,000 feet long and still leave a channel over 600 feet wide between the end of the pier and the outer breakwater, a sufficient distance for all purposes. These piers, without counting the north

side of the northerly pier, would have a frontage of 20,000 feet, or nearly four miles. At present these line steamers use a dock frontage of about 3,300 feet. The new piers would provide nearly six times the wharfage that these steamers now have. The south pier could also be extended in an "L" shape in a southerly direction, should it be necessary. All of these piers should be constructed and maintained by the city.

The city, under its charter, has power:

31. To construct and keep in repair canals and slips for the accommodation of commerce.

32. To erect and keep in repair public landing places, wharves, docks and levees.

33. To regulate and control the use of public landing places, wharves, docks and levees.

The city would have to obtain the right from the United States government to construct these piers, and if necessary, the authority of the state, through the legislature, to build them. This ought not to be difficult to obtain.

As a riparian owner of the end of the streets on the lake front, it would have the right to extend piers from the shore to navigable water, but, in this case, the piers would go beyond this point. In other cases the riparian rights could be purchased. At these piers 20 feet of water could be easily obtained, as for most of the distance there is now a greater depth than that.

The piers could be reached by the tracks of the Illinois Central Railroad on the South Side, and by street cars over the Randolph street viaduct.

Mr. Wacker—The question then arises, if we had better facilities—let me put it this way—if we had had better facilities, would our shipping by water increase instead of decrease?

Mr. Kremer—No.

Mr. Wacker—Supposing we had taken precautions, building the best sort of harbor for all of our conditions, so that vessels could have operated at the least possible expense, would we then have gained?

Mr. Kremer—No.

Mr. Wacker—You think conditions are such that no matter what we have, we could not increase?

Mr. Kremer—No. Chicago has lost its coal trade by water and has lost its grain trade by water.

Mr. Wacker—There is nothing which can overcome that?

Mr. Kremer—Nothing can overcome that. It is my argument that they have not increased elevator facilities in the Chicago river. Within the last fifteen years, as fast as they have burned they have not built them up. A number they have demolished and torn down because they had no use for them, and this was all before we had the larger vessels that could not get into the Chicago river. This was at a time when we had vessels that could go anywhere in the Chicago river and take full loads. In the last ten years, as statistics show, the grain receipts in Chicago have fallen off very materially, and rail shipments have increased during the last twenty-five years. There is something more I didn't say. Millions of bushels of grain go around and avoid Chicago

that formerly came to Chicago. In other words, they run directly from the farm to the coast by rail instead of taking it to Chicago and going to the expense of handling it here and at the point of discharge from the lake vessel.

The Chairman—If we have this waterway to the Gulf, what would you suggest?

Mr. Kremer—During this agitation for a waterway to the Gulf you have noticed that no person who had grown fins or had anything to do with navigation was connected with it. Every landlubber and traveling man out of wholesale houses has been interested in the deep waterway, but they have not interested, but have steered clear of, anybody who could swim or had fins on him. I will tell you all about that. Mr. Counselman nearly went broke building a line of first-class steel boats running directly from Duluth to Liverpool. He had a whole line of them. They were the best you could build for the money and they were right up to date of the full canal size of the Welland canal. They can carry over 3,000 tons through the canal and when they get out of the canal into deep water they can make it 3,000. And Mr. Counselman had to give it up. He was not in competition with roads and he could carry his cargo through from Liverpool to Duluth. The Illinois and Michigan has got about a dozen old boats. The railroads have driven everything else off. The government has paid out seven and a half million dollars to build a canal from Rock Island on the Mississippi river to Hennepin on the Illinois river, and there is not a canal boat in sight for it yet. Why? Boats on that canal can carry 25,000 bushels of corn and on the Illinois they can carry 20,000 bushels of corn, and you will not be able to make a waterway to the Gulf or anywhere else until you take the railroads and compel them to make a rate that is not going to drive those people out of business, and that will come when they have government control of railroads, and I don't believe before that time.

It seems to me that this Commission should bear in mind at all times that there are other harbors in Chicago than the Chicago river. The great harbor at South Chicago is as much a part of the municipality as the stream which now flows from Lake Michigan into the drainage channel. In fact, this Commission should be broad enough to ignore state lines and look across the border into Indiana, where two harbors have been added to the commercial interests of Chicago. To me it seems quite immaterial whether Indiana Harbor and Gary are within the city limits of Chicago or in the State of Illinois. The vast industrial region now so rapidly developing in the Calumet district is an integral part of the great Western metropolis. If it were not for the fact that the census is taken once every ten years, there would not be any except a sentimental reason for desiring that the great manufacturing region across the state line in Indiana were a part of this municipality. In business relations, in traffic, in all that goes to bind people together, it is quite as much a part of Chicago as the other suburbs which happen to fall inside of the city limits.

The general offices of the companies having factories across the state line in Indiana are located in Chicago. The stockholders mostly reside here. The concerns are to a large extent Chicago enterprises which have gone outside the city limits merely because they could get

land there with water and railroad facilities at a less cost than could be had within the limits of the municipality.

From time to time of late the Chicago Real Estate Board has seen fit to express antagonism, not only toward enterprises which have located outside the Chicago and Calumet region, but also to the manufacturing districts along the Calumet river within the city limits. The real estate men seem to have taken the position that Chicago is confined to the region around the Chicago river. They have even attacked a congressman for having aided in securing appropriations for the Calumet river. If the Chicago Real Estate Board represents only property in the loop district and along the branches of the Chicago river, its position may seem logical so far as it is concerned, but when it pretends to speak for the entire metropolitan district of Chicago the selfishness of its position is too apparent. Nor is the proposition of the Real Estate Board a sound one, even from the standpoint of enlightened selfishness. Speaking in general terms, all real estate in Chicago is benefited and increased in value by the upbuilding of a great manufacturing region along the Indiana border line of the city. This new manufacturing region is not competing with Chicago. The vast steel mills at Gary are not being built at Chicago's expense. If at any city's expense, these mills are offensive to Pittsburg. Instead of antagonizing new manufacturing regions around Chicago, the Real Estate Board should felicitate its members that this city has advantages at its very doors sufficient to attract great enterprises over the allurements of other manufacturing centers.

While this Commission is primarily in the interest of the municipality of Chicago, it seems to me that it could very wisely take within its scope of investigation the needs of all the harbors in the Chicago metropolitan district.

While it may be true that the Chicago river, taken by itself, has suffered a great loss in recent years by the changing conditions of commerce, it is again the changing conditions of commerce which are bringing back to this metropolitan district a lake commerce greater than it ever had before. Within a year millions of tons of iron ore will be pouring into Gary. The Calumet canal at Indiana Harbor will be extended far into the interior to reach the factories along its banks. In place of lumber, there will be iron ore, and in the employment of men the manufacture of iron ore will give sustenance to a far greater body of men than were ever employed on the lumber docks.

It is no idle dream that within twenty years a man will be able to walk on stone or cement sidewalks from Lake Forest on the north to Gary on the east. There will not be a break in the line of human habitations in this distance of fifty miles. It will all be in Chicago, regardless of county or state.

While not deprecating in the slightest degree the importance of the Chicago river in the water commerce of the city, I would urge this Commission to take the broader view that all the harbors in this metropolitan district are entitled to their fullest consideration. The Chicago river should be improved to the fullest extent, for its commerce will always be the most important factor in the city's manufacturing and commercial life. But while the main artery is being cared for, the other arteries should not be neglected. Nor should there be any jealousy between the four

harbors now within the metropolitan district. The good of the whole would be best conserved by developing to the fullest extent the various parts.

## CAPT. D. SULLIVAN.

I think we have the finest commercial river in the world today west of 22d street. The current there is almost imperceptible. One other subject: The 600-foot steamer is built for a specific purpose. You could not charter them for grain at 10 cents a bushel when they have their own ore to haul. They are made to handle iron ore. We had a steamer carrying 11,000 tons of ore unloaded in 4 hours and 23 minutes. The dock is made to fit this ship at this end and another built at the other end, and these ships are built for a specific purpose. The Anchor Line and Western Transit Company are building ships. They come in and go as far as Van Buren street, and the steamer will go out of here with 6,000 tons of freight. She could not go to the turning basin. One of the bridges above is a barrier, so she goes up stern first from the forks of the river. I have been connected with the lake harbors for 40 years and have served in every position. We have in Chicago the finest river there is any place, I believe, in the United States. You spoke of the North branch. We have more facilities in the North branch than Milwaukee and Three Rivers combined. I take it that Milwaukee will have the same difficulty we are in. They are building 75-foot draws. Menominee is a worse congested port than any part of our river. I happen to be operating the river at Milwaukee in the Milwaukee coal trade.

Mr. Wacker—You don't believe in an outer harbor?

Capt. Sullivan—No.

Mr. Conover—Not for any purpose at all?

Capt. Sullivan—Not for any purpose at all. The Whaleback once landed at the outer harbor and could not do business. She landed at the foot of Randolph street, across the viaduct.

The Chairman—Could not get to her?

Capt. Sullivan—People would not go down there. You have to make it handy for the people going on little excursions.

Mr. Wacker—You believe that proper development of the rivers would take care of future commerce?

Capt. Sullivan—Absolutely I believe that. I feel that South Water street is responsible for two-thirds of the congestion not only of the river, but of the streets here. My suggestion would be to remove it to the Haymarket Square or some other place. It is right on the line of the river and there is a congestion there at all times, during business hours. It makes no difference whether the boats go through or not. If there were passenger docks from Wells street east to Dearborn street, I thing that would be the solution to the problem.

Mr. Delano—I have been told that the South Water street traffic would have to stay where the passenger boats that brought in the fruit from across the lake landed; wherever they landed determined where the produce business would have to be done. Is that reasonable?

Capt. Sullivan—I don't believe that is reasonable. I believe the trade

will follow its requirements, and I believe that if these commission houses were put on the West Side with docks for these boats, those boats that bring that in can go any place.

## MR. H. H. WALKER.

The proper way to treat the shipping in the Chicago river to provide against congestion would be through basins with wide openings at the river or slip entrances. This would be of the very greatest advantage for handling commerce, there being three sides which could be utilized by rail, and the different kinds of commerce could be handled at the different basins and could be made most convenient for all purposes, and besides, the labor would be in close proximity to the work, on high lands, well drained, all of which would avoid congestion.

The North branch and the South fork, if widened and straightened at points with these frequent basins for dockage, would avoid the necessity of a great width on these branches.

The channel in red, marked on the small map, extending from the South fork to the drainage channel, is supposed to be 70 or 80 feet wide, stationary bridges to be utilized, to take the sewerage from the stockyards and 39th street conduit in order to protect the main channel, which in a measure would stop the free flow in the main channel. This narrow channel would also be a solution for the deplorable condition of the Gage Park district. Should the sewerage at any time become so great as to foul the water, establish a pumping station near the west end of this channel, cut a channel to or near this point from the main drainage channel, which would flow virtually clean water through the remaining portion of the channel. A basin for shipping could be established at the north line of Stickney, and a pumping station in like manner for the West fork. This would leave the water in the main channel virtually clean and most valuable for manufacturing purposes.

Fill up the Illinois and Michigan canal to a point near Summit.

Treat the Calumet and Wilmette districts as suggested by Mr. Alvord.

No city in the world would have a better system. A city of ten million inhabitants or more would be amply cared for in this way, and the Chicago taxpayers would feel that they were getting value for their money.

As to an outer harbor, it is only an engineering possibility without practical value. The possibility of fouling the drinking water and obstructing the free flow into the river and the southeasterly current of the lake would endanger the lives of the people of this city and the Indiana towns, making it a most dangerous proposition. It would also be most inconvenient for shipping, as we would have but one side for entrance to reach this harbor, for labor, teams and railroads. We have only to look at Michigan City as an example of an outer harbor, with an expenditure of over one million dollars, and the tonnage is a matter of very small moment.

As I look at it, the general question of Chicago's harbor is but a part of a much larger problem of Chicago's transportation. The harbor is only concerned as to the delivery and receipt of traffic by water, and

that is only a part of the whole question of transportation, and the fundamental fact at the basis of the harbor is the fact that water transportation, other things being equal, is cheaper than rail transportation. If we are prepared to grant that Chicago ought to have the benefit of cheaper transportation—that is, water transportation—we must believe as sensible men that it is possible for Chicago to avail herself of that water transportation.

I believe another fact we must get at, if we are going to look at this, is that a larger Chicago means a larger traffic. I believe that the traffic will be larger when she has three millions, four millions or five millions. The fact is, two million people are bound to create more traffic than half a million. It is bound to be the case that a larger number of people in Chicago create a larger traffic. If we are going to have a larger traffic with the increase of this city in population, and if water traffic is cheaper than rail traffic, other things being equal, it goes without saying that the bigger Chicago gets, the bigger water traffic she will have, if she wants it and avails herself of her privileges.

Commercially, when we cease to prepare for future commerce we shall cease to grow, so I don't think there is anything for any sensible Chicago man to do but to get right down to that bed-rock fact that we have to prepare for larger commerce. To prepare for that larger commerce we have to provide to handle some of it by water. This question of Chicago's harbor and its adequacy for the future is an absolutely new question in a certain way. Ten years ago if you had been sitting as a Commission, as you are now to consider Chicago's harbor and to find a solution for it, you would not be in the position you are today. It is only within the last two or three years, especially the last year, that the people have wakened up as never before to the future and possibilities of water transportation.

I can recognize only two classes of objections to proposed harbor development: First, the cost. It is going to cost a lot of money to make a channel wide enough and deep enough to handle the commerce of the Great Lakes, and to handle the commerce that will go through the Lakes-to-the-Gulf waterway. Chicago years ago was not accustomed to count the cost; why should the question of cost enter into this thing, when we don't count it in matters by comparison? We are facing a proposition of outer parks, with a proposition to buy land for the future. The spending of money on the things I have mentioned is unimportant as compared with the vital life of this city, when compared with this matter of our water transportation, and so it is no time for Chicago to be counting the cost at the suggestion of millions of dollars of expenditure for a proper harbor.

The second class of objections have to do with the obstructions. You have to have bridges, for instance, to go over this harbor. Do we not all know that this transportation problem is going to be solved through a subway? It is my belief that inside of ten years we won't have the people going above the river. If we look to the future we will see that we are going to have our main travel in subways. I believe that a 200-foot channel in the clear would answer the purposes of Chicago's shipping, but we have not got it. Theoretically there is a passage of water about the abutment, but as a matter of fact there is no passage,

but the water is stagnant alongside of the abutment. I figured it out that at the Lake street bridge, half of the space is taken up by solid piling. At the State street bridge and Dearborn street bridge there is no passage of water. Furthermore, between those abutments, the river is absolutely stagnant. The other day when the ice came down the river the ice between the abutments was absolutely motionless. You have today a channel of 130 feet. If we had 200 feet absolutely clear with abutments back of the dock line, I believe as a matter of navigation we could handle the biggest vessel in the lakes. In the last report of the Chicago Association of Commerce there is a report of the River Improvement Committee of that association. The statement is made that if the center-pier bridges were taken out, 80 per cent of the commerce of the lakes can go anywhere in the Chicago river, and that certain other improvements which could be made without widening the channel a bit, the other 20 per cent can be taken care of in the Chicago river. That meets the objection that has been made that a river 200 feet wide is not useful as a harbor. I was surprised to hear the statement made that this channel 200 feet wide was incapable of providing a modern harbor. At the same time, the statement was made that a channel 160 feet wide was an ideal harbor for these very same vessels.

## MR. HENRY W. LEE.

Mr. Lee appeared before the Commission to present the claims of the Calumet region. Mr. Lee analyzed the commerce of Chicago and Calumet and concluded that the Calumet river has been responsible for the great gain in Chicago's marine business. He presented a plan for utilizing Lake Calumet as a harbor. He said:

The bottom of the lake under several inches of ooze and loam is viscous clay. It is now used and has been used for over twenty years for making brick by a factory south of Pullman. It is the kind of bottom that will make excavation necessary but once. The lake at the present time varies in depth from 5 to 12 feet. Properly docked, the material excavated from the lake could be deposited behind the dock lines.

## CAPT. J. G. KEITH.

I am opposed to trying to make a harbor out of the Chicago river. I have been here for forty or forty-five years, and in the beginning of the period we could get along much better than we can today, in the river. Our river was a trifle narrower at that time than it is now, and we had no current to contend with. The current has destroyed our river for harbor purposes. The river is not a harbor as long as our streets are to be 300 and 400 feet apart, and they come there with an opening which in the largest part of the largest modern bridges is 140 feet, and some of them, Van Buren street, I think, is about 100. The vessels we have had that have been doing business in the Chicago river up until the present time were about 250 to 300 feet long, and very few of them exceed the latter length. What are we going to do with boats 600 feet long? If we are going to carry freight cheaply, we must do it in large quantities. The first year I began sailing here on the lakes,

forty-odd years ago, $4 and $5 a ton was paid for iron ore from Lake Superior to Lake Erie ports. The last two or three years it was reduced to 75 cents per ton, and if I am not mistaken it will reach probably 50 cents a ton this year. Now, in my early days probably about a thousand tons or twelve or fifteen hundred tons was the extent of the cargo; today they are moving 10,000 tons. Where they can carry large quantities they carry it cheaper. If we have the largest city on the lakes and the smallest harbor, let's make our harbor adequate so we can do work, put it where we can accommodate the largest vessel coming here, and the cheapest freight. You can't get into this river quickly.

On our Chicago river today, from 18th street to Chicago avenue, it is safe to say that three-fourths or four-fifths of the docks is owned by railroads, and the balance is occupied by buildings like Farwell's and other large buildings.

Now, with the river in that condition, to say nothing of the current, we are handicapped. We cannot get the large vessels here, and if we cannot get the larger vessels here, we cannot get the cheaper freight. In early days I recollect when Chicago shipped grain probably as greatly as it does now, and all the coal came into Chicago. Occasionally there was a cargo that would go to Milwaukee, but only an occasional cargo. It all came to Chicago. The excess of the Milwaukee freight rate over Chicago was one or two cents a bushel. That will exceed the present rate. I chartered a vessel today for 1¾ cents. Now, today Milwaukee is a smaller shipper of grain and a large receiver of coal. If Milwaukee wants to ship a cargo of grain, which is only an occasional cargo the last few years, they will ship that cargo for one-eighth or one-quarter of a cent cheaper than we can do it from Chicago. When the vessel is empty, she doesn't want to come to Chicago, for there is 85 miles twice over and the expense of the trip and terminal expenses coming to Chicago will be greater than the amount I have named, one-quarter cent a bushel. So it does not want to come to Chicago. Our terminal charges are too high. We go to the stockyards today, away up six miles from the lake. Ordinarily, with vessels of from three to four thousand tons capacity, it will take from five to six hours to make the trip. Not infrequently it will take double that time. Probably half a day to go and half a day to come back, and $150 is the cheapest towing you can make it, and sometimes it is more than that amount. I have had a vessel of about 3,000 tons that has been trading the last two or three years, and carries 3,000 to 2,500 tons of coal to Sheboygan. I have had that same vessel go in and unload in six hours and fifty minutes, from the time she got to the dock until she left the dock. It will take that length of time to go from Lake Michigan up to Schenck's coal dock. There is about twenty-four hours' lost time and from $100 to $150 towing charges, and for time lost I should add $200 a day for a vessel of that kind. If I take that same vessel to Manitowoc, where they have their docks a distance of but three or four squares from the lake, I will get my cargo to the dock in less than an hour, unload my cargo, turn around and go out again, and it will not cost me a dollar.

With the current in your river and the close proximity of one bridge to another, you will never make a harbor of the river for Chicago, if it is a thousand feet wide. She has room for the harbor on the lake front,

and there is where it should be placed. We have a great flat of land for about six, seven or eight miles of water outside of Chicago. You can go six or seven miles out from the lake shore and have no more than 60 feet anyhow. You can go a mile or a mile and a quarter and not exceed 30 feet of water. You can keep within a mile of shore and not be in more than 26 feet of water. If you had a sea wall—a breakwater, if you choose to call it that—well, running a mile, it would be better for a mile and a quarter, and still better a mile and a half, and the depth would only be three or four feet greater in one case than the other, having that sea wall. There will be no trouble in getting a commodious harbor and plenty of water that will take the largest ship that is here.

How much are we going to take here? I should say extend the breakwater out perhaps a half a mile further than our present piers, extend that about a half a mile or three-quarters of a mile or any amount that you can agree upon, and continue that down to, I should say, about five miles. Five would run it down to about 47th or 48th street. There would be about twelve or fifteen million dollars as the cost of building your docks and slips inside of the sea wall, but here you will gain from three to four thousand acres of land. Call it $20,000,000, if you choose, for making the docks and slips and railroad tracks inside. How much is that land worth after you get it? It might not be wisdom if you were to ask me to put the value upon it, but some of you undoubtedly are real estate men, and I belong to the web-footed fraternity and know nothing about real estate, but I would say that $20,000 an acre would be a small value. If that is the case, it will run about $100,000,000, more or less, so, looking at the matter from a financial point, Chicago would be the gainer. A Commission such as you have got here might build the docks or rent the docks, and it will be but a year or two until these docks are a source of revenue instead of a cost.

At this point Capt. Keith presented and explained a somewhat detailed plan for an outer harbor on the south of the mouth of the Chicago river. This plan provided for a breakwater a mile or a mile and an eighth from the shore, and running to a point opposite 47th or 48th street, protecting docks and slips within.

Mr. Conover—After you got that harbor, what kind of freight would you get in there?

Capt. Keith—Everything. If we take a railroad line extending their lines into the prairie, they don't wait until they have the country settled up; they run out their line and the country will work to it. If we have no harbor here, men will not send us freight here. If you have a harbor, freight will come. It will take everything. One of the principal features here will be distributing coal over the country. It is safe to say that Milwaukee distributes through the country a million tons of coal, if not more. Sheboygan and Manitowoc each send out large quantities. Chicago used to do this, but since Chicago has grown we have six miles to go through the city into the interior, and with the cost of towage that trade has broken away. There is not a ton of soft coal that Chicago ships today that comes from Lake Erie.

The Calumet will be hampered just as we are today, if you give it time. Should it build up, it will be in precisely the same fix. As it is, Calumet can do its business in a mile and a half. They have fewer

bridges on the Calumet, and as it is the cities like those little towns north of us are leaching our blood from us because they don't have to go away back into the country. Just as soon as they get to be anything like Chicago they will be in just the same fix as we are now. I can remember in my time when you went to Van Buren street you were going a long way up the river.

Mr. Wacker—How large an outer harbor would you have down there?

Capt. Keith—Just the same as you have got here. You have exactly the same condition. You have this big flat of shallow water into the lake nearly over all the Illinois coast. When you get to Michigan you have lost it. You have the same flat opposite the Calumet you have in Chicago, and the Calumet can have the same as you have here in Chicago. You have to have a harbor on the outside and not through a long, narrow stream to come in, if you want to compete with the little towns with harbors on the lake front. At present, if you put it there, you cannot compete with them. If you give the Calumet time, so that the first mile and a half of river front is taken up with docks and enterprises, and it moves the commerce further back, she has come to the same place Chicago is now in. Nature has given us the finest opportunity in the world and we don't seem to have taken advantage of it. Our people have never run, in Chicago, to the marine business. Railroads, lumber, hogs and railroad stock they are skilled at, but when it comes to owning vessels, they are not. The railroads can concentrate their efforts and get what they want, while the vessels are divided up.

### MR. J. J. WAIT,
### Merchants' Lighterage Company.

Almost all I was going to say has been told you by Capt. Keith, and I think he has the right idea of a harbor. He spoke largely from the standpoint of the bulk freighter. The kind of traffic I am personally interested in is merchandise. I understand that we are trying to handle in Chicago about 35 per cent of the freight and rail merchandise with about 8 per cent of the facilities, 8.56. The railroad transfer houses are not adequate. They have not been able to get property, perhaps, to increase them. Several of the railroad boat houses will accommodate only one boat at a time, like the St. Paul, the Alton and the Wabash; and the lake and rail line boats are hampered also with lack of rail facilities. They have not been able to get the property. It is too expensive along the main river.

We have not a 200-foot river. On the North branch the St. Paul and Northwestern are putting in new bridges with only 100-foot span. This type of bridge is very objectionable. Many bridges have arched trusses underneath, which makes it difficult in bad weather for small vessels, tugs and lighters to go under them. Take State street bridge, for example. There is only five or six inches of edgeway for a roofed lighter to go under. There is a great draft of air from the large buildings and with a strong wind from the lake the water piles up in the river, and the consequence is the tugs and lighters whistle for the bridge to open, and that means more bridge nuisance.

Three plans I have heard talked about. The one to string the harbor

clear along the lake front, is unnecessary. We don't need all that space. I agree with Captain Keith we ought to have an outer breakwater, and then suggest a dockage, beginning with the mouth of the river, as is necessary for present needs. There would be no trouble with vessels surging at their berth with a good breakwater.

Mr. Delano—Isn't there a good breakwater outside of the Illinois Central?

Mr. Wait—No, there are too wide openings in it, and the sea comes in there too heavy for small craft. The sea runs past Kirk's high enough to break the vessels' lines lying at the dock. There would be plenty of room to build seaward almost to the present government breakwater, and outside and accommodate docks there. It would not be necessary at present to shut off the lake front. Have docks strung along the north and south from the mouth of the river to Oak street, where the Streeter tract is, that is three-quarters of a mile, and that might be extended to Chicago avenue. A track could be extended clear to the lighthouse. The Northwestern is already in there on the north pier. Assuming those docks would be created, it would be a simple matter to admit the railroads and give them connection. There ought to be something besides the Northwestern in there, some of the Belt Lines ought to be given a right of way into such a dock. The south pier is reached by the Illinois Central, and then a line across down at 16th street, the St. Charles Air Line, which connects with nearly all the roads.

The other proposition that I have heard is for a harbor down at Canalport. I think that is to come, perhaps before you gentlemen reach a conclusion. The contracts have been let, I have been informed. I am told that the Chicago Junction Railway have let contracts for a big joint transfer house, and if that becomes a harbor you will have a bridge nuisance greater than we ever had.

The Chairman—How large boats do they expect to operate down there?

Mr. Wait—They can't get very large ones down there; they demonstrated that the other day. There was a steamer stuck in the draw of one of the bridges, and we tried with one of the lighters to go through the draw, both sides of the bridge, and she could not stem the current. The water rose a foot and a half, so it was uphill, and our ligther could not get by until the steamer got through the draw. What will happen if at every street crossing we have a bridge? Two vessels cannot pass with any safety at all, even two 50-foot boats could not pass through the bridge with safety. I favor the outer harbor plan here because it is near the business portion of the city, and it can be done at a moderate cost.

There is another point in connection with the harbor at the mouth of the river. Assuming that the Lakes-to-the-Gulf deep waterway is built, it is apparent that the economical lake carrier will be too large to go down the canal. It is also apparent that the canal barge will not be an economical lake carrier and perhaps not seaworthy. There will have to be a transfer and that will increase the through traffic from here. We have to provide some convenient point for them to transfer. There are plenty of people who advocate that it be at the head of the drainage

canal. That will mean that all the boats will have to go down the river. Canal barges with more readiness can go to the mouth of the river than boats can go down the river. Docks at the lake front can be reached by lighter clear to Taylor street without any trouble.

## MR. ROBT. R. M'CORMICK,
### President of the Sanitary District of Chicago.

It occurred to me that an outer harbor plan, which used the existing breakwater, would be comparatively simple, because you would not need to construct an entirely new and expensive breakwater.

The present breakwater extended down to the east and possibly an extension of this breakwater would furnish shelter for any outer dockage you want to put in south of Chicago avenue.

Another natural advantage of an outer harbor here is its immediate proximity to the opening of the Chicago river, for the use of lighters to connect with industrial plants along the Chicago river, and to make connection with such barges as will ever use the deep waterway, but I don't conceive that a canal of any dimensions that will ever be adopted will ever be used by lake or ocean-going ships. A ship going out onto the lake has such of its bulk taken up with machinery and other space that it could not compete economically with the canal boat which does not have to put in machinery that would take up that amount of space, and probably would be nothing but a box afloat in the water. A harbor here might be a transfer point for freight, either going up the North branch of the Chicago river or going down the South branch. A plan for a lake front harbor in this vicinity would rather necessitate a detour of the center of the city, or a cut-off at some point, say between 22d street and 39th street.

A cut-off between 22d street and 39th street would be a very serious thing, for the reason that the downtown streets and West Side streets and North Side streets all sewer into the various branches of the Chicago river, and if you cut a channel through at 22d street of any large cross-section, the water would take the shortest distance and the lake water would flow into the drainage canal and would make the Chicago river dead. Now, that would be regulated, somebody would say, by locks and controlling works, but I don't think for harbor purposes controlling works would be of any value. You know of the proposed Calumet canal. A part of the plan is controlling works, which will absolutely prevent any large amount of water from the south coming to the lake front, but there the proposition is only one of drainage, while this is one of a harbor, so I don't think you can put controlling works in. If you don't have controlling works there you will have to plan a different sewerage system in the downtown district.

Mr. Delano—Do I understand that the proposed plan of the Calumet cut-off is such that navigation in connection with the canal would not be feasible?

Mr. McCormick—I would not say it would not be feasible, but it would not be feasible from the point of view of continued traffic, because in time of high water the controlling works would have to be closed, and then navigation through that point would be through a lock, which

could be only used to a very small extent. I am going to speak of the Calumet channel from a harbor viewpoint later.

You have on the North and South branches—in fact, the same thing all through the downtown district—frequent bridges, which prevent ships of any size docking, no matter what the demands of trade may be. You don't begin to have any room for dockage until you come down to 16th street, where the slips begin, and the only dockage you could have in that part of the city would be by means of slips, and I think it is absurd to think you could cut back 300 or 400 feet in the downtown district, so you don't get any dockage created until you get south of 18th or 20th street. Of course, radical improvement of the Chicago river and the improvement of the dockage facilities would run up property values to an enormous extent. I have always felt that this propaganda which is going on for radical improvement of the Chicago river was in the interest of those dock property owners at the south end of the South branch. Of course, it would add a great value to the dock properties belonging to the Sanitary District on each side of the drainage canal.

Now, the widening of the Chicago river as it is being done today, and for the past five or six years, has been done on a most inequitable basis. It has appeared to me that the widening of the Chicago river even to 200 feet should have been done by special assessment, and, of course, there would be a very large public assessment. If you should find a plan that people would agree to, to widen the Chicago river to whatever extent appeared advisable, and you found that this wide river didn't cut the river into too many parts, the plan to widen the Chicago river by special assessment would be fair, and the city might be assessed a great deal for the improved value of the drainage canal, perhaps. I don't know if you have it in mind. There is no occasion to widen the South branch beyond 200 feet for drainage needs, because it is the most expensive way of furnishing water to the drainage canal. If a greater amount of water than 600,000 feet a minute is to flow into the drainage canal from this end, the most economical way would be by putting in sewers like the 39th street sewer, where you don't have to condemn valuable property, so any widening of the river beyond 200 feet would be purely a harbor proposition, and it will be purely to the advantage of the people owning property at the south end and to the advantage of the dock property of the drainage canal. I have always felt this agitation was gotten up by those people.

The drainage canal as a harbor is a great opportunity, I think. I have no scale here showing the amount of property owned by the Sanitary District, but I think it is 1,000 feet wide. It is planned to finally widen this canal to 220 feet, but we have adopted a rule that no permanent improvements, no concrete docks or permanent buildings shall be built within 100 feet of the dock lines that are established; in other words, there will be 420 feet between any permanent improvements, so if the future of commerce demands, it can be widened in individual places to make docks or widened to make the stream 400 feet wide.

The drainage canal suffers at present from the disadvantage of having no turning basin. There is a small turning basin at Lockport and one somewhat larger just outside of the power house. Our present board has under consideration the installation of a turning basin at Summit.

This question is now in the committee on engineering and it is a legal question whether we have the right to put a turning basin in the drainage canal, and it is a question that has never come before me officially, so I have never taken a stand on the matter. But if the right is not there, and it is necessary, it would be a simple matter to get an amendment to the law and put the turning basin in, or get the federal government to do it, or something of that kind, so a turning basin can be put in, and that may be very valuable. If the deep waterway goes through, the drainage canal is just as much the natural port of Chicago, west, as the mouth of the Chicago river appears to me to be the natural port east. A man does not bring his coal and vegetables and his dinner in through the front door, and down the back stairs to the kitchen. He brings them in the back door and serves it to the table. So commodities coming from the lake, it seems to me, naturally distribute as near the mouth of the river as possible, and commodities coming from the south and west naturally distribute through the south and west.

### MR. H. J. FIXMER,
### Civil Engineer.

Mr. Fixmer presented a system of improvements designed to relieve traffic congestion in Chicago. The most important feature of this plan was the construction of a ship canal about 14th street, connecting the South branch with Lake Michigan, the building of docks along this canal and at its mouth, and the substitution of fixed for movable bridges from Lake street to Harrison street. He said:

The canal which I propose be built at 14th street is manifestly a direct connection of Lake Michigan with the completed drainage canal. It is therefore evident that this canal seeks to utilize the fortunate advantage of the drainage canal as a waterway channel and will fulfill the requirements for an ideal harbor. At the Lake Michigan end of this proposed canal a series of slips will be constructed to accommodate such railroads as now use the Illinois Central Railroad trackage. These slips, constituting a sort of lake front harbor, will be limited as terminals for just these railroads. Provision for other railroads will be made along these railroads. This lake front harbor will probably not need to extend further south than 22d street. This will not interfere to any great extent with Mr. D. H. Burnham's lake front parkway plans, since his plans can be adopted up to the southern limit of this lake front harbor and be connected with the present park system by a wide boulevard west to Michigan boulevard.

### MR. W. K. KAVANAUGH, of St. Louis,
### President of the Lakes-to-the-Gulf Deep Waterway Association.

Every large city in this country practically is located on a body of water or a waterway. The future development of this country, with the co-ordination of water and rail traffic, will almost inevitably occur, according to my way of thinking.

Chicago is at the head of this great project, and, of course, Chicago must have the greatest terminal facilities outside of New Orleans that

is located on this line of transportation. As to what is the best plan of working out the local problem here, it would be impossible for me to give anything like a good idea. I should say, though, that in handling the traffic for a great city, that it would be all important to consider your business centers and make the deliveries as close to these business centers as possible. The farther away you get from it the more expensive it becomes for re-handling and transporting.

The Secretary—Has any one made a study of the trade that would be developed by such a waterway?

Mr. Kavanaugh—As I said before, it would be largely theoretical. I don't believe—between you and me and the board here—I don't believe that the amount of traffic that is going to be developed between points, between centers on this waterway is to be so large as the development of the traffic which will seek big concentrated centers like Chicago and St. Louis, to be re-shipped further. I think there will be a great deal of traffic that will find itself this way. It is fair to say it is almost impossible for any railroad going through a wilderness to tell in advance what the development is going to be along that railroad. I don't believe that the water course is going to stand alone. I think that the railroad and the water courses are going to work together. I heard Mr. Hill before the National Rivers and Harbors Congress in Washington, and Mr. Hill was very strong in the belief that this great Western country undeveloped was going to be developed very rapidly and make such commerce that the railroads would be very glad to handle the passengers and light expensive traffic, and ship the heavy commodities by water.

## MR. W. F. M'KINNEY,
### Industrial Real Estate.

I wish to say in the beginning that the thought which I have been able to give the question of an outer harbor for the city of Chicago has been based upon an experience both as a shipper and a transfer warehouseman, and running into the costs of transfer of carload lots that are consigned by lake and rail to Chicago and thence to be re-consigned to industries surrounding the city or delivered in the city, and from my practical experience as a receiver of carload lots. The disadvantage of being tied to a single trunk line, or a number of trunk lines, at different receiving points has forced upon me the belief that it would be unwise to adopt any plans for building an immense great breakwater and outer harbor with only a single belt line connection to take the tonnage away from all boats which can operate free upon the waters of our government, and I therefore brought myself to believe that it was our duty to consider the adoption of some harbor plan that would connect us up with belt lines, not on the river, but on the lake—namely, an outer harbor; whereas, if we should adopt an inner harbor plan it would necessitate such frequent operation of draws and congestion of the river and a great percentage of that tonnage would be through business, which can just as well be interchanged on the lake front as to be taken to our only belt line connection, or the old Santa Fe elevator. At the old Santa Fe elevator location in the Chicago River and Indiana Harbor Railroad has been organized and has connections with every railroad in

Chicago through connection with the Chicago Junction from the river over the Santa Fe tracks and the Rockwell street line.

The first relief that I have seen from our river transfer comes from that conception of Richard Fitzgerald, because he is the father of that plan. That plan provided for a connection with all the boats that go into the river and go down the river that far, and has a tariff that is now published providing for delivery of car lots to every railroad in Chicago at from $3 to $4.50, and for a delivery to almost every industry, especially on the Chicago Junction Belt, of $6.50 to $8.50. Since the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul, which have the best river facilities—perhaps I should say the Illinois Central as well—but the St. Paul and the Northwestern withdrew from the reciprocal switching arrangement which provided for apparently a fair rate for switching cars to the territory of the other lines, and after they withdrew their rates for switching cars from the North Side to the West Side was from $9 to $30 a car, chiefly based on the Illinois distance tariff rate, ignoring and refusing to give a switching rate that the lake and rail line vessels would absorb. All of the lake line managers have indicated a willingness to absorb $6.50, and perhaps up to $9, hence through the newest belt line connection which we have, excepting that they have not yet their warehouse completed, the river men can absorb all that the Chicago river and Indiana railroad would charge. If we pay the cost, and there is a profit in operating a switching line from four miles down on the river, the vesselmen would be far better pleased to absorb even a higher switching rate from an outer harbor that would not involve loss of time or the expense of getting into the main channel and either the North fork or the South fork.

Further, the great percentage of the lake and rail line business which the boats carry between the Eastern ports and the Western ports, and especially Chicago, is through business. In 1907 it was over 50,000 carloads, and the lake and rail line men say that they can easily adapt themselves to loading their vessels entirely with through business; hence, the vessel that would berth at an outer harbor would have no use of entering the river or being delayed for city deliveries, thus reducing the use of the main river as a port, especially for through business.

My conception of what an outer harbor could provide, if located somewhere between 16th street on the north and 40th street on the south, would be that it would be and could be connected up through the St. Charles Air Line at 16th street, which is owned jointly by four great trunk lines—namely, the Chicago & Northwestern, the Chicago, Burlington & Quincy, the Illinois Central and the Michigan Central—and where also they give rights to other connecting roads to run their own engines in upon the tracks of the St. Charles Air Line for greatly reduced switching charge or trackage charge as compared with any other railroad facilities that I have known of. Through the 16th street belt line it is fair to estimate that three-fourths of the Western roads could be connected up with an outer harbor through that route, and those that could not be connected up could be reached by connection with the Chicago Junction over its 40th street line, which has direct connection, as you all know, with every railroad in Chicago.

It looks to me from my experience with the belt line tariffs and their

charges that every railroad in Chicago could be reached from the lake front between 16th street and 40th street at a charge not exceeding $6, and that possibly the majority of them at half that price, because of the fact of the importance of the 16th street connection being owned by three of the great Western roads, who are right at hand and would not be obliged to absorb any belt line charge, providing they were brought into agreeable working arrangement.

My notion of an outer harbor has been to keep it free from manufacture. I only thought of it as being a great transfer harbor. I have thought of its location between 16th and 40th street as providing a location where 25 years from now would be close to or opposite the center of distribution of Chicago. I think you will find that 25 years ago the center of distribution was Lake street, and that center has been gradually moved south until now I claim it is 22d street. Many with whom I have talked think that 12th street is far enough south to designate as the center of distribution, and then my reply to them is that they have not kept in touch with the great west and southwest section of the city. In that section of the city is where the belt lines have superb connections with all railroads and where the tax on tonnage is reduced to a minimum.

The Secretary—Why is it that large industrial plants locate on the Sanitary District canal? Why do they seek to get on the water if they have good rail connections?

Mr. McKinney—It is a leveler of rates. The best authority, I believe, on that subject is Mr. Chamberlain of the Corn Products Company, who selected a location well down the channel, and who declined all other locations that didn't have the advantages which they have there.

The Secretary—Can they use water craft enough to regulate the rates?

Mr. McKinney—His company will spend approximately $400,000 to place them in shape to utilize the advantages to be furnished by the ship canal and will bring their belt line up to the docks.

The Secretary—What sort of shipments would they make, down the drainage canal or from here to Buffalo?

Mr. McKinney—They would practically load the entire vessel or a large part of the tonnage of a vessel that would be called to their dock to load. In normal times they would give a boat a large part of the cargo, provided it would make a special trip down there to get it.

## MR. ALBERT H. SCHERZER,
### Bridge Engineer.

The Chicago river, with its branches and connecting navigable waterways, is the basis of Chicago's past and future supremacy and prosperity.

The conservation and progressive improvement of their valuable waterway benefits every vested interest and industry in Chicago. As soon as the few remaining center pier swing bridge obstructions are removed from the Chicago river, the largest modern vessels can distribute their great cargoes direct to the manufacturing plants, railroad

terminals, elevators, warehouses, etc. Prohibitively expensive lighterage, cartage, rehandling and delays will then be avoided.

The land bordering along the lake front of Chicago is far too costly and precious to use for factories, warehouses and freight terminals.

The most advantageous, economical sites for railroad terminals, manufacturing industries, etc., must necessarily be along the navigable waterways within the interior of the city, where ample, economical, adjacent sites are also available for the homes of multitudes of employes.

The entire invaluable lake front for 25 miles will then be available for much higher uses. The entire lake front of Chicago for a distance of two, three or four miles from the present shore can easily, rapidly and economically be reclaimed and developed into the most extensive, health-creating and priceless sites for the most magnificent parks, public buildings and works of art the world has ever seen.

During the past several years great progress has been made in the removal of obstructive center-pier swing bridges from the Chicago river. When the few remaining obstructive swing bridges are removed from the Chicago river, the great $55,000,000 sanitary ship canal will be accessible to modern lake vessels, immediately increasing the value of the dock lands owned by the Sanitary District of Chicago several hundred per cent.

## HON. THEODORE E. BURTON,
### Chairman Committee on Rivers and Harbors of the National House of Representatives.

As a general proposition, to come to the meat of the thing, I think the lake traffic will have to be handled out in the open lake. The rivers and creeks which have been utilized as harbors are too small for the convenient handling of the modern freighter. That tendency is shown at Buffalo, where a very large breakwater has been built; at Cleveland, where another breakwater has been built. Duluth is an exceptional harbor. It is a great natural harbor, and by improvements can be made like a harbor on the ocean, like an inner harbor or bay.

There is an exceptional situation at Chicago. I have studied it a great deal. Two years ago I didn't think that this outer basin inside of the breakwater would be utilized in any such way as the projected outer harbor at Cleveland and Buffalo, although it would be utilized to a considerable extent. I take it the main reasons why traffic has not developed out there are two or three.

First, the enormous congestion of all these streets down here. It will be extremely difficult, and almost impossible, to carry large quantities of freight to the lake front, or bring it away, because every wagon would be compelled to wend its way through traffic that is already so large that it is very difficult to handle it in the streets.

Then there is another reason. One railway practically has whatever private ownership belongs to any private corporation on the lake shore. That is the Illinois Central, and that has no special interest in the development of the lake traffic. There may be other reasons besides that. In any event, it is true that the development out there has been altogether a disappointment.

There is a question which you can decide better than I. As I understand you have an underground tunnel, a railroad. Will it be possible by utilizing this underground passage to take a quantity of freight out there on the lake front?

Mr. Randolph—It is entirely possible, but the trouble of using the underground system is, it is all too small. It is only 6 feet by 7 feet.

Mr. Burton—Is it contemplated to enlarge that and make it a larger underground passage?

Mr. Randolph—No, sir; the city has guarded that very carefully. They have attempted to make it larger, but the ordinance under which they are operating does not permit them to.

Mr. Burton—Is it feared it might be dangerous to undermine the buildings?

Mr. Randolph—No, there are no engineering difficulties, but the fact is that this ordinance was gotten through before the city council realized what they were doing and they want to hold them down to what they got in this surreptitious way. They don't feel they are entitled to any very considerate treatment at the hands of the council.

Mr. Burton—There are no engineering or mechanical objections?

Mr. Randolph—No.

Mr. Burton—With the great growth of our cities it is not only probable, but reasonable, to suppose that there will be transportation underground a great deal more than any one can realize now. The population is increasing so that provision must be made for it. As far as the surface is concerned, we have gone about as far as we can here. Overhead or elevated railroads would be expensive and difficult, and probably would be utilized for the most part, if not exclusively, for passenger traffic, so in the growth of the city I regard it as probable that in time there will be underground tunnels developed on a much larger scale than at present. Would that make it convenient and easy to deliver freight out there on the lake front? You gentlemen know more about that than I.

Mr. Randolph—On a proper scale. If tunnels could be built for our standard gauge railroads, it could be done.

Mr. Burton—Strange as it may seem, I think the hauling of package and miscellaneous freight has not shown any considerable increase. It is a great question between water and rail transportation. The railroads have so much wider and more convenient methods and means of distribution they are taking more and more the package freight. Then again, there is a question that arises from artificial conditions, and that is how far the railroads are going to take away traffic which naturally belongs to water. If any of you have read the report of the Inland Waterways Commission you will find we dwell on that at some length. I have been in conference with persons who have been connected with transportation lines on the lakes. The carrying of freight for short distances is pretty well restricted to the route from Cleveland to Detroit, and Cleveland to Buffalo, and from Buffalo to Detroit, and then some here on Lake Michigan from Chicago to the eastern shore of Lake Michigan, and there is a considerable amount of traffic at Kenosha, Milwaukee and Racine, but when you compare the quantity of freight carried by boats (that is, package freight) now, with ten years ago, and

take into account the enormously greater amount of freight that is carried, the lake is not keeping pace with rail.

I speak of the tendency with this qualification. It is highly probable that in the future there will be a readjustment of the relations between railroads and waterways. Just at present, unless the conditions are exceptional, water transportation lines are not meeting with great success unless they are affiliated with railroads. You take that freight brought here to Marshall Field. I venture the conjecture that the great majority of that is brought upon boats owned by the Erie and Pennsylvania Railroads.

Here is another case, that is more out on the open water, the freight that is carried from New York to the points along the sound—Boston, etc. That is carried in boats that are owned by or affiliated with the New York, New Haven & Hartford Railroad. The railroads get naturally all the freight, but the question will ultimately have to be settled as a great economic problem to be determined by the relative cheapness of the two methods of carrying; that is, if you can carry freight by water more cheaply, it will be carried that way; if by rail, it will be carried that way; if part rail and part water, it will be carried that way, and the present artificial conditions, as I have termed them, will, if there is wise legislation and wise decision of the subject, be brought to an end. As it is now, if a waterway shows any great progress in the carrying of freight, the railroads put down the freight rate beside it.

Some of you may have heard of the President going down the Mississippi river to Memphis. There was quite a little celebration in Memphis, and I believe the President put the finishing touches on the fastening of a bale of cotton that was going to be taken down the river. They were going to organize a transportation line meant to carry cotton from Memphis to New Orleans. I don't know whether that bale was carried down or not. I don't believe there were any others. What are the reasons? The railroads heard of it, and they made a cut under in the rates. There are also a lot of collateral questions which it is impossible to go over except in a superficial way. Two things affect the methods of carrying cotton out of Memphis: one is that for years they have supplied the mills of New England and the East, and the most of their cotton has gone in that direction and not been exported. Another is that all their banking arrangements were based on that, so it was impossible to change and ship down to New Orleans. Still another is that the railroads insure the freight if it is burned, or destroyed or injured. It is difficult to fix the insurance rate on a boat. Insurance companies say the risk is uncertain; that the price that they charge may be altogether too much. They say they have no basis on which to make up the insurance.

Another thing, the boat transportation lines would not have a supply all the year round, or to carry both ways. All of those things work against them.

In the autumn of 1906 the warehouses and sidewalks of Memphis were filled with bales of cotton, and they were complaining that the railroads could not handle them, but not a bale of that cotton went down by water. That same tendency is at work with merchandise.

Waterways still have the ascendency where certain circumstances exist. The best illustration is here on the Great Lakes where enormous quantities of iron ore is brought from the upper lakes to the lower lakes and down to South Chicago and eventually it will go to Gary. There it is possible to build boats that conveniently handle iron ore into which the ore can be loaded in a very short time and from which the ore can be unloaded rapidly and the business is so enormous that it justifies the construction of expensive machinery for loading and unloading and the building of boats adapted to that purpose. That is the best illustration of water transportation we have. There is another in the carrying of coal that goes the other way. The rates are lower because the freights are much less than the down freights. Then there is corn, such a quantity of that is carried that it can be carried at a reasonable price.

If I would tell what I have heard from some transportation lines not connected with railroads it would illustrate the tendency to divert the traffic toward the railroads and take it away from the boats. So eminent a student of transportation as Herbert Knox Smith has said he thought the time was coming when, unless there was some co-operation between waterways and railroads, that it would be but a very short time until there would be no boats carrying any considerable quantity of package freight unless they were owned by railroads.

I will tell you another case that is most remarkable in the United States. That is on the Monongahela river where there are mines up the river and furnaces and mills down below. They can carry the coal to the boats from the mines, load it on barges and take it below where the furnaces are. It is probably the cheapest transportation—I was going to say in the world. That is a case, however, where the raw material and the fuel which the mill consumes are on the same river and near together.

There is another case in which coal is shipped down from Pittsburg and on the Ohio river clear down to New Orleans where they can assemble great fleets of barges, 50,000 tons or more.

What I hope to see is the time when the waterways and railroads will co-operate and freight will be carried, just as I suggested a few minutes ago, in the way it can be carried most cheaply, but the present tendency is all the other way, for the railroads discriminate by arbitrary regulations and by superior terminals, to carry all the freight, save, bear in mind, these exceptional cases. It would be a very clever man who could tell whether the handling of freight in Chicago is going to increase or diminish in future. Every indication now is that here it will diminish.

What the future of water transportation is going to be I don't think any one can tell, even with a partial degree of certainty. It is true that I have met a great many men who feel quite sure about it, but their assuredness is about in proportion to the degree of attention they have given it. The only thing that would create a revolution would be the harmonizing of the interests of the railroads and the companies that transport freight by water. Of course there is a certain amount of water borne freight that will take care of itself. It is very obvious

what some of the disadvantages of water transportation are. One I have mentioned. A man has a factory on a railroad. He can ship to almost every hamlet in the United States and Canada. If he has a factory located on the river it is confined to the river. There is another thing. Take the Ohio river, there is an oscillation in the height. That makes it impossible to build warehouses and equipment for loading and unloading beside the river. That is, your river will be here one day and there the next. Those are permanent disadvantages unless of course you have some great system of conservation by which floods are impounded in head waters. Another arbitrary disadvantage is the practice of the railroad to run out water transportation lines by lowering its rates when in competition and making up by higher charges somewhere else. I am inclined to think that that provision in the Interstate Law authorizing them to charge lower rates where there is water competition has been carried farther than the framers of the law intended it.

Col. Bixby—Chicago is looking forward with a great deal of interest to the day when they hope to have Lake Michigan connected with the Mississippi river.

Mr. Burton—Of course, if that went through there would be an increased amount of loading and unloading and transferring here.

Mr. Conover—Would a harbor on the lake be adequate for the proper development of any such commerce?

Mr. Burton—I should think it would be, if there should be any great development. Of course I want to have an open mind about that 14 foot waterway. It is a magnificent conception and I think perhaps sometime it will be built.

Mr. Sikes—Perhaps you might tell about the Cleveland situation.

Mr. Burton—There is a great outer basin. We handle still the most of our trade in a narrow crooked river, but more and more the heavy boats and the heavy freight is going into the outer portion. I think it is perfectly safe to say that the traffic out in the outer harbor as we call it is bound to increase and in time entirely over-shadow that in the inner harbor, but here you have rather a different condition. One is that these towns that are near at hand are all accessible to the same railroads. Another thing is the greatly increased difficulty of handling traffic on the river. These bridges I have gone over two or three times a day and it is just crowded with automobiles, trucks and teams. If there were not some time when the bridges were closed it would be a very serious matter for the traffic. All these conditions make Chicago very exceptional in the handling of traffic.

If there would be a time when any considerable share of that lake front would be taken up with docks and wharves,—a very obvious use would be for factories,—factories to which you can bring raw material right from boats coming in on the open lake, but the whole lake front is occupied by residence property. Is not the larger share of that taken up by residences where the property is so valuable and the improvement so considerable that it would not be turned over to industrial purposes?

Mr. Bixby—It used to be all residences, but now the business has

driven them out and there is a general tendency of the business ultimately to go down toward the south end of the town.

Mr. Burton—But that land lying along the lake is of such value it would not be utilized for factories in any place within several miles of the Chicago river.

Col. Bixby—I think there is such a difference of opinion on that subject I don't like to say. I think that the business will drive the residences out.

Mr. Burton—You will find a very excellent discussion of the effect of the Erie canal on rates and on traffic in the report of the Industrial Commission, one of the best discussions on the comparative fields of water and rail transportation. It is going to be republished by the department of commerce and labor.

The railroads are highly equipped beside that canal. They will get the freight. There is a peculiar condition in regard to railroad property the effect of which people don't realize. A railroad costs a certain sum for a right of way, for tracks, for sections, for stations which is substantially uniform whether it carries 1,000 tons of freight or 10,000. Suppose a railroad is doing business, carrying a certain quantity of freight, 60,000,000 or something like that. Then they have tracks, they have locomotives and they have their cars. They have their office force, section men, and all that sort of thing. All at once a waterway is developed there. That waterway goes into the carrying of the same particular kind of freight. What does your company do? They are going to cut under and carry that freight, because the additional cost of carrying that will be very little to the railroad, but the loss by reason of its taking away would be very considerable. There may be another place where the railroad may be carrying only a certain quality of freight. Suddenly someone comes along and says, "I want you to carry coarser freight,"—coal or ore. "Will you do it?" The railroad manager enters into competition. He offers a figure, which, if you are to make your computation on the basis of the cost of carrying that coal or ore you would think he was carrying it at a loss, but when it is carried as a part of the general system perhaps to fill in when traffic is slack, or in any event to add merely an additional burden on an expense which is fixed, whether the traffic is small or large, it may be profitable for him to carry it. I think that is the great point of railroad transportation and the relation between railroads and competing waterways that is not understood. The tendency of the railroads is to get more and more of this coarse trade.

When I have said all this, I don't mean there is not a very great field for water transportation if properly handled and if there is a rational adjustment between railways and water ways. The ideal development would be a time in which they both worked together.

Mr. Conover—Is that possible, in your judgment?

Mr. Burton—I think it is. I don't believe you could carry it to every detail or item, but I think you could carry it to such an extent as to make a division between the two that would be for the benefit of both. Of course the tendency is to cut under and get freight.

I came across this instance in Russia. The minister of public works

was complaining of the railroads which were owned by the state. His department was paying for improving the waterways and of building and maintaining rivers. He complained that when they had improved a waterway, the minister in charge of the railways would put down the rate and compete with them. That is the way they do things in Russia. It shows the extent to which one cuts in on the other, even in this case where the same owner owned and maintained them both.

Mr. Chairman—If we had no waterways we would have higher freight rates?

Mr. Burton—Decidedly.

## MR. LEONARD BRONSON,
### Associate Editor, The American Lumberman.

The outer harbor project seems to us, and I think to most of the business interests of Chicago, to be almost utterly without foundation and common sense. The purposes of a harbor in Chicago are different than they are in a good many other ports. We are pointed to Amsterdam, Antwerp and so forth, where they have spent immense sums of money in creating harbors, or enlarging them, but they are for the purpose, primarily, of trans-shipment, the receipt of vessels, loading of vessels and trans-shipment from rail to vessel or vessel to rail. Chicago is more of a commercial and industrial city than the other cities, and probably always will be, until the deep waterway to the Gulf is a fact. The purpose of the Chicago river, the real utility of it lies in the ability by means of it, of the vessels plying the Great Lakes, and later perhaps the deep waterway to reach our manufacturing establishments, our warehouses, our storage yards or all sorts. It is certainly more useful in that way than in the mere shipment and receipt of goods from the Great Lakes, though the two are parts of the same problem.

Business is handled more economically by water, where water is available, than it is any other way, particularly in heavy commodities, such as coal, grain, iron and all the raw materials manufactured. Therefore the harbor of Chicago should present sites and dockage directly in connection with those manufacturing establishments and commercial storage yards. That involves an immense area. I assume that if you were to establish the outer harbor and close the river practically except to lighters, that you would have say 25 miles of wharves with an average depth of 300 feet. The city has now, it is said, 60 miles of dock frontage, not all of it occupied. I presume it is fair to say that 25 miles, 300 feet deep, would be required. Perhaps Mr. Ewen could make a rough guess. When we consider the enormous sum that it must take and also consider it means the removal of industries, storage establishments to that lake front, it would appear to a layman, to one not an engineer, it would be much cheaper to develop the Chicago river to the relationship to trade we had 25 or 30 years ago and the conditions prevailing then.

Furthermore, from a sentimental as well as from a practical standpoint, do we want our lake front covered with docks from Lincoln to Jackson park? Do we want the only really attractive feature of the

city destroyed, making it less desirable for residences as well as for business, and less profitable perhaps in every way?

If Captain Hamilton were here, who is an old captain familiar with the river and familiar with other harbors around the lakes, he would tell you that it is not difficult to handle vessels through a 200 foot channel, and that if you can get a 200 foot unobstructed flow then there will be little trouble with bridges and obstructions of that sort. That means that we should either have unobstructed draws of 200 feet so that the river can flow with even volume, or if the draws are narrowed, by-passes should be constructed so that the current can be maintained of that width. If that be done, if the by-passes are to be used they must be of a different type from those already put in. There is a by-pass at Adams street, down by Jackson and Van Buren street, I think. The water in there is stagnant and appears to move not at all. If you get where you can see under the dock into the water that is supposed to be moving you will find it is as black as your black derby.

The trouble that vessels find lies not in the speed of the current in the river, so practical pilots say to us, but in the variableness of the current and the delays. Probably there is hardly a day in the season of navigation that vessels do not meet with accidents. They may be minor. No damage may be done to the vessel or bridges. Oftentimes damage is done. A rail is taken away or some of the rigging taken away. There is almost every day some accident on the river which means at the least delay and annoyance. One of the results of that situation is that it costs 10 cents a ton more to bring coal to Chicago than it does to other ports on the lakes. Instead of being the greatest coal port on the upper lakes we have sunk several points.

Establish a 200 foot channel of unobstructed flow, whether your bridge openings are fully 200 feet or not, and the purpose of navigation is served. Vessels can navigate it, but you can straighten the river out and better it. You cannot put a 200 foot boat in this river with the present curves. Those must be straightened out. At the junction of the branches at Franklin street, over the Northwestern depot there is a projection there that runs out I should think 300 feet. That is pretty nearly useless. On one part of it there is a five story building. There is a little coal scattered around there, and junk from the Northwestern's operation and a few side tracks and empty cars and it seems to serve but very little useful purposes. Cut that off and you would have a turning basin there any vessel on the Great Lakes could turn in.

We must have the river straightened. We must have the full width secured, and where people wish to use the dockage permanently they should at their own expense donate a sufficient width so that the ordinary vessels will lie outside of the current. The slips we have serve that purpose, and vessels lying there do not obstruct the current. Then we must have the river straightened by all means. All the utilities that are constructed, every permanent work that is done, every dollar expended as a permanency should be so expended that it will not be wasted. None of us suppose that the river is going to be made as it

should be within the next five years, although great headway should be made. Nothing should be allowed to obstruct it.

Furthermore, we believe in the utilization of the river and in the promotion of Chicago's business industry and prosperity, and that some public means should be set on foot by which dock facilities shall be reserved for industries that need the river and navigation.

Some people are fond of saying that the Calumet will take care of the business of Chicago, but do we want to drive the business away from Chicago? Do we want any more of the growth of the business to go there, or might we not want to attract some of the new establishments to Chicago proper, as well as to provide for commercial institutions here. To do that, to hold our own and provide for any growth, we must have these improvements.

Furthermore, the river, properly improved, and the drainage canal, give access to large areas suitable for great manufacturing establishments. Enterprises like the great harvester works as well as works which require hundreds of acres can find them within the limits of Chicago and are directly tributary to the river if we will give access to them and if they are not spoiled, cut up and fail of development. Perhaps the Chicago Association of Commerce, perhaps the city through some commission, or citizens who are interested in this matter in some way could arrange that sites would be available for industries seeking new locations and for the natural growth of the industries and commercial enterprises now here. It is somewhat strange to learn that there are great institutions here in Chicago that, despairing of getting what they should have, are content to accept anything they can get.

The lumber business of Chicago, as far as the Great Lakes is concerned, has undoubtedly reached its maximum. While perhaps there may be an increase in receipts of lumber by lake by importation of Canadian lumber, it is uncertain whether that increase will more than offset the natural decrease from our own source of supply. Michigan, Superior and Huron, to a small extent have been our sources of supply, as far as lumber shipped by lake is concerned. Those reserved are being cut away quite rapidly. There has been a decrease in receipts of that sort, but Canadian lumber is coming here in increasing quantities every year and is certain to maintain a large volume of lake business. I don't recall the figures now, I think it is about 400 million feet of lumber received by lake last year. It is a very respectable tonnage, however, and that will be maintained at a large figure for a good many years, always, perhaps.

When the Lakes-to-the-Gulf waterway is opened, if it should be, we will receive lumber from the south by barge which would be distributed by the Chicago yards. The Chicago lumber business is being maintained. Its receipts last year were larger than ever before. Of course the volume of business has been increased by rail receipts, but the handling of lumber by water should not be discouraged. It is that which makes wholesale business. Chicago as a wholesale market will pretty nearly be destroyed when you shut off the receipts of lumber by water. If we are going to do that business we must do it with the modern type of vessel which now cannot get into the river. As fast as our vessels

wear out, sink or burn so much is cut off from the lumber business of Chicago. What applies to lumber applies more strongly to coal and other heavy commodities. Lumber is not a decreasing business. It is maintained and will be maintained for many years, for decades, by the importation from Canada, but even that will at some time wane.

Mr. Conover—If we had reciprocity with Canada would that largely increase, in your judgment?

Mr. Bronson—Some, but not much. I don't see that that will increase very rapidly as forests are cut away. I don't think that reciprocity or tariff has much to do with that.

## MR. HERMAN H. HETTLER,
### President Herman H. Hettler Lumber Co.

Being invited to express his opinion on the subject under discussion Mr. Hettler said:

I think I can merely express an opinion that I believe that there is a reasonable prospect of receipts by water being somewhat increased in the future. You are all familiar with the fact there is a $2 duty on lumber from Canada. The Canadian forests are the nearest forests to Chicago, and any one wanting to get at it becomes wise to the fact that no lumber can be manufactured even in Canada and be distributed to the great consuming markets of Chicago, Milwaukee, Cleveland, etc., and have that rate of $2 a ton. Now the duty of $2 a thousand is all a matter of opinion. Mr. Bronson may figure it makes but very little difference, but I think that is one thing that in the future may have some effect, because in addition to pine they have vast areas of hemlock. Hard wood timber at present is not available. There is no means practically of getting it out, but the attention of the entire country has been called to the fact, and with the endeavor to preserve the resources of the Continent it is to be assumed in the course of time some scheme will be found to make it available.

The public, or people using lumber, have adhered very closely in ordinary construction work for buildings, and so forth, to the white pine for roofing and siding, believing that every other kind of wood was inferior, and so they insisted and demanded, all the large users of lumber have been using that kind of stuff. When that kind of lumber becomes scarce around the lakes the manufacturers along there went to the interior where there were large areas of timber at Wausau, Minneapolis, and so forth. It is a well known fact that the supply of white pine and Norway has been decreasing at points tributary to water and rail, so that in recent years the buyers of lumber, and the users, have taken up and are using a great deal of other stock which they formerly would not use. For example, I presume in our yard here up to within ten years ago 80 per cent was white pine and Norway, the other 20 per cent would be yellow pine and hemlock. I presume for building construction work in houses, etc., two-thirds of the lumber used is hemlock and yellow pine. Yellow pine is wood that comes from the South, and hemlock comes from the interior, but can also be shipped to Chicago by lake. Hemlock is the only wood that can be used in

competition when it comes to price, with yellow pine. You will have points, in my opinion for a good many years to come which will produce hemlock and all kinds of hard woods which will reach Chicago by water.

### MR. E. E. HOOPER,
### Secretary Lumbermen's Association of Chicago.

I have estimated by taking the tonnage receipts of the Southern roads that 50 per cent of the lumber received here was hard wood and yellow pine-commerce from the South, even in view of the fact of the enormous rates they are charging now of $12 a thousand. When you have your waterways completed to the Gulf, as is contemplated by Congress and now agitated all over the country, there are millions and millions of feet of lumber that will come here by water on account of the cheapness of its rates, that is impossible to come today, and they are burning it up. When you bring that lumber here to be manufactured it is going to decrease the cost to the consumer and going to make your city one of the greatest in the country as a manufacturing point in lumber. Those things also should be considered. As Mr. Hettler says, this trade is going to depend largely upon Canadian lumber, because our lumber is being very rapidly cut down. I am informed that the lumber they would have paid no attention to a few years ago they are cutting out of the forests, and a good deal of it being disposed of at a better profit than they used to get.

Mr. Delano—I want to ask Captain Hamilton a question. He said a moment ago that the vessels disliked to come into the Chicago river by reason of the accidents. Do you believe if the channel was widened to 200 feet that these difficulties would be overcome and the vessels would be glad to come in here?

Captain Hamilton—Yes, sir. The Niagara river today can be navigated very freely because there is no obstruction in the river and you have a current that runs two or three miles faster than the Chicago river. At Tonawanda the current runs three or four miles, yet we have no trouble with it.

Mr. Delano—There are no bridges?

Captain Hamilton—Only a few. If the abutments did not project into the river here you would not know you had the bridges because there would be no perceptible change in the current. You are coming along, for instance between Randolph or anywhere else west of there. You strike a bridge where the abutment extends into the river and you naturally strike a little stronger current there. We are not bothered going out at all, but coming with it when she strikes a little more current you will see the boat go to one side of the river or the other. You have no control over the rudder in handling the ship at all. Since they opened the drainage canal we paid more dock damage than we did all the years before that.

Mr. Sikes—You watched Mr. Counselman's experience in sending boats through the St. Lawrence river?

Captain Hamilton—Counselman's ideas were all right, but they were

handicapped by the insurance problem. By the competitors more than anything else.

Mr. Sikes—What was the insurance risk?

Captain Hamilton—The Gulf of St. Lawrence is a little harder risk than are the ocean or rivers, but just as soon as Mr. Counselman started his line of boats, he came in opposition to the fellows in New York that were in touch with the carriers, and rates went up 150 per cent. They could not carry stuff at that rate at all.

Mr. Conover—It took three or four times as long?

Captain Hamilton—Possibly, but they would be able to carry freight so much cheaper it was an object to the shipper. It is a good deal like that barge proposition I heard spoken of some time ago, in the Erie canal. If we had a canal down there where a ship that could navigate the lakes could go through it would cheapen freight, at the same time it would not help Buffalo as they would not break bulk there. It would be the same problem if you undertook to use the barge proposition.

## MR. WILLIAM H. JOHNSON,
### General Western Agent Erie and Western Transportation Company (Anchor Line).

I presume the Commission in asking me to appear before them to speak on the Chicago harbor situation with which I am most familiar, had reference to the package freight traffic handled to, from and through Chicago. I have no doubt the other traffic interests, such as coal, lumber and grain, have already appeared before you.

I will confine my talk to the package freight traffic, excluding the so-called Lake Michigan lines, which is a traffic that should come under a separate class from the traffic originating at lower lake ports. I will give you the facilities we have at present for handling it, and its relative volume as compared with competing ports, and advance several ideas for the improvement of harbor facilities which ought to reduce the terminal and operating charges of the lower lake carriers, enabling them to make rates that should increase the traffic of this port and to hold the traffic it is fast losing to other lake ports.

In dealing with the question it necessarily must be handled under two heads:

First, the so-called local traffic delivered to Chicago firms and taken from Chicago firms for shipment east. This traffic embraces tonnage consumed in Chicago and tonnage delivered to mercantile houses for distribution by their selling departments at other points. The traffic is handled by eight lake lines, owned or controlled by the Eastern Trunk lines, consisting of fifty-four steamers, with a carrying capacity of 185,000 tons. With proper harbor facilities this fleet could carry annually into Chicago four million tons and out of Chicago four million tons. However, under present conditions this fleet handles a little less than two and a half million tons of package freight and grain in and out of the harbor each season.

The lines have terminals for delivering and receiving Chicago city

freight located on the Main branch of the Chicago river, with the exception of the Rutland Transit Co., located on the North branch, and the Union Steamboat Line, located on the South branch. These terminals, with the exception of the Anchor Line and Rutland Transit Company, are leased. The terminals are located in the so-called congested district, where land values are high and constantly increasing in value; consequently the carrying charges of the property in the invested values and increased values are constantly increasing the expenses of operation. The narrow river, with its obstructions, makes the expense of getting to and from these docks excessive and out of proportion to expenses incurred at other ports for similar service. Then, the lake lines undertake to and do deliver traffic at Chicago rates to industries located on the Main river, North and South branches. These deliveries are made in several ways, based entirely upon the most economical method from an operating standpoint. As an illustration—if we find the quantity of freight for delivery at one of these docks can be teamed or lightered at less cost than the tug bills, or if the delay to the steamer would be too great to send her to one of these private docks, we take the freight off at our city dock and make the delivery by lighter or by team, in some cases switching. The cost for performing this service is about fifty cents per ton, exclusive of handling charges (and insurance in case of property lightered).

To give you some idea of the vessels employed in this service. The steamer Clarion, built in 1881, with a capacity of 2,000 tons, keel 238 feet, beam 36 feet, drawing 15½ to 16 feet of water, loaded, was considered a mammoth boat on the lakes at that time, and was capable of getting around the river and making the required deliveries at small expense. This steamer is still employed in this trade, and there has been no material change in the river during that time, with the exception of the removal of a few of the center pier bridges and the deepening of the channel, which was accomplished last year.

In 1902 the Anchor Line, after considering the question of building steamers for the Chicago trade based upon the maximum size that could be moved about in the Chicago river, decided to build three boats based upon their investigation—350 feet keel, 46 feet beam, carrying maximum load on about 19½ feet of water. These boats will carry about 4,500 tons of package freight. Since the removal of the tunnels these boats are capable of handling their maximum tonnage to points on the Chicago river, its North and South branches, but (and I wish to emphasize this) only at a tremendous expense in the use of tugs, as the boats have to be towed in or out stern first, and loss of steamboat time. The tug bills for a boat of the Muncy type will average about $250 per trip in the Chicago river. One trip this season, where we made most of the railroad docks and no private docks other than our city dock, the expense for towing was $320, and the lost time we figured about two days. The working time of these boats is from 7 o'clock in the morning to 10 o'clock at night. We are unable to move them on account of bridge hours between 6:30 and 8:30 in the morning and 5 and 7 o'clock in the evening.

The boats built in the last few years by package freight carriers

have all been on the basis of 5,000 tons as a minimum carrying capacity, with the exception of the Rutland Transit Company, the size of whose boats is confined to the limitations of the Welland canal, and it is logical to conclude that the lines never will be built smaller—in fact, a smaller boat would be a poor investment under competing conditions. It is also safe to assume that no 10,000 ton, 600 feet by 60 feet boats will be built by the lake lines unless harbor conditions and terminal facilities are developed to take care of such boats; and consequently the shipping public cannot have the advantage of the lowest possible rates on water-borne freight that iron ore and grain are enjoying.

The second head under which this subject should be handled is the package freight traffic coming to Chicago for trans-shipment to points east and west, in connection with the western roads. All I have said regarding the operation of steamers in the foregoing applies to this particular traffic.

The interchange of traffic between the lake lines and western railroads at Chicago for many years has been performed at greater expense to those interests than at any other port on the Great Lakes and the traffic has suffered greater delays in moving through Chicago than through the ports of Milwaukee, Duluth, Manitowoc, Gladstone and Cleveland. These disabilities are continually interfering with the routing of the lake traffic through the Chicago gateway.

Those competent to judge, affirm that it takes six days longer to get lake and rail traffic through the Chicago gateway than through any other port, and it is not uncommon for shippers to demur when asked to route traffic lake and rail through Chicago when they have an outlet through other ports.

In a report recently prepared by the American Railway Association Committee on car efficiency, it was claimed the average delay on a car of lake and rail east-bound package freight through Chicago was 6.1 days and on west-bound 3.2 days. In our opinion these figures are not exaggerated. It cannot be claimed with fairness that the lake lines are responsible for this condition of things at Chicago as compared with other lake ports.

We realize the western roads are handling the lake and rail traffic in congested districts, in many instances where they handle their city and in some instances passenger traffic and to purchase additional land for proper warehouses and docks would be rather expensive, but we are of the opinion it would be feasible at Chicago to handle the traffic through a joint warehouse on the Chicago Junction Railroad which has favorable connection for short hauls between the western roads and such a warehouse. An outer harbor, of course, would be preferable.

We realize the traffic and operating officials of the western roads have not had their attention called to the disparity between their lake and rail facilities at Chicago and those of the railroads having termini at the other lake ports, for that reason we have prepared and attach a list of warehouses furnished by the western railroads for interchange traffic with the lake lines at the ports of Chicago, Duluth, Gladstone and Manitowoc, also a statement showing the methods of interchange of traffic with the roads at Chicago which is entirely a car to boat pro-

position east-bound, the railroads using their cars for storage instead of furnishing proper warehouse facilities, compelling the lake lines to take traffic out of cars, whereas at all other lake ports the western roads unload the east-bound freight from cars into ample warehouses at the expense of the railroads.

These statements show nine western roads handling lake and rail traffic at Chicago having 144,500 square feet of floor space, an average to each of the roads of 17,055 square feet. Duluth, three railroads, has 928,500 square feet floor space, an average of each road of 309,500 square feet floor space. Manitowoc, one railroad, has 194,088 square feet floor space. Milwaukee, three railroads, one of which has no warehouse facilities, has 367,484 square feet floor space, an average to each road of 122,494 square feet floor space. In other words each one of the railroads at the other ports have more warehouse facilities than the nine railroads at Chicago, or putting it in another way, of the total warehouse floor space used for lake and trail traffic at Chicago, Duluth, Gladstone, Manitowoc and Milwaukee, Chicago has only 8.6 per cent, handling 37 per cent of the traffic; Duluth 56 per cent, handling 35 per cent of the traffic; Milwaukee 22 per cent, handling 18 per cent of the traffic; even Gladstone with its one road has 11 per cent, handling only 6.5 of the traffic.

Some of the disabilities of steamers doing business at Chicago as compared with other ports are as follows:

Loading and unloading freight Chicago, 39 cents a ton; Duluth and Milwaukee, 23 cents a ton; towing bills at Chicago, 50 per cent greater. At Chicago, under the most favorable circumstances, a steamer can handle 1,200 tons per day; at Duluth 4,000 tons per day; Gladstone and Manitowoc, 3,800 tons per day. A 4,000 ton steamer can take her load in one day at Duluth; it requires three days at Chicago.

RECAPITULATION OF WAREHOUSE FACILITIES FURNISHED BY WESTERN ROADS FOR INTER-CHANGE TRAFIC WITH LAKE LINES AT UPPER LAKE PORTS COMPARED WITH PER CENT OF BUSINESS HANDLED.

| Port | Number Warehouses | Number Railroads | Square Feet Floor Space | Percentage Warehouse Floor Space For each Port | Average Sqare Feet Floor Space For each Road | Percent Package Freight All Trafic handled through each Port 1907 East. |
|---|---|---|---|---|---|---|
| Chicago | 8 | 9 | 144,500 | 8.64 | 17,055 | 37.4 |
| Duluth | 9 | 3 | 928,500 | 55.79 | 309,500 | 35.5 |
| Gladstone | 2 | 1 | 194,080 | 11.09 | 194,080 | 6.6 |
| Milwaukee | 12 | 3 | 367,484 | 2.54 | 122,494 | 1.7 |
| Manitowoc | 1 | 1 | 37,800 | 21.94 | 37,800 | 18 9 |
| | | | 1,672,364 | | | 100 00 |

MILWAUKEE WAREHOUSES OF WESTERN RAILROADS USED FOR INTER CHANGE TRAFFIC WITH LAKE LINES.

| Railroad | Building Number | Length | Width | Square Feet Floor Space |
|---|---|---|---|---|
| C. M. & St. P. ------- | 10 | 351 | 60 | 21,060 |
| " ------- | 10 | 237 | 60 | 15,420 |
| " ------- | 10 2nd floor | 257 | 60 | 15,420 |
| " ------- | 4 | 400 | 60 | 24,000 |
| " ------- | 5 | 384 | 60 | 23,040 |
| " ------- | .. | 91 | 51 | 4,641 |
| " ------- | 6 | 405 | 66 | 26,730 |
| " ------- | .. | 66 | ? | 3,300 |
| " ------- | 14 | 253 | 77 | 19,481 |
| " ------- | 9 | 549 | 50 | 27,450 |
| " ------- | 8 | 340 | 50 | 17,000 |
| " ------- | 3 | 250 | 175 | 43,750 |
| " ------- | 12 | 495 | 88 | 43,560 |
| " ------- | 15 | 202 | 72 | 14,544 |
| " ------- | 22 | 146 | 48 | 7,008 |
| Total C. M. & St. P. --- | | | | 290,964 |
| C. & N. W..... | C. N. W. | 612 | 112 to 150 | 76,500 |
| Wisconsin Central | No Warehouse | | | |
| Total All Railroads----- | | | | 387,464 |

MANITOWOC WAREHOUSE OF WESTERN RAILROADS USED FOR INTER-CHANGE TRAFFIC WITH LAKE LINES.

| Railroad | Building Number | Length | Width | Square Feet Floor Space |
|---|---|---|---|---|
| Wisconsin Central------ | 1 | 945 | 40 | 37,800 |

DULUTH WAREHOUSES OF WESTERN ROADS USED FOR INTERCHANGE TRAFFIC WITH LAKE LINES.

| Railroad | Building | Length | Width | Square Feet Floor Space | |
|---|---|---|---|---|---|
| N. P. | 1 | 600 | 50 | 30,000 | |
| " | 2 | 1000 | 80 | 80,000 | |
| " | 3 | 325 | 120 | 39,000 | |
| " | 4 | 700 | 60 | 42,000 | |
| " | 5 | 1020 | 90 | 91,800 | |
| " | 6 | 1130 | 90 | 111,700 | |
| | | | | | 394,500 |
| Great Northern | 1 | 1550 | 120 | 186,000 | |
| " " | 2nd floor | 1550 | 120 | 186,000 | |
| | | | | | 372,000 |
| C. St. P. M. & O. | 1 (Dul.) | 900 | 80 | 72,000 | |
| " Itasca) | 1 | 1500 | 80 | 90,000 | |
| | | | | | 162,000 |

GLADSTONE WAREHOUSES OF M. ST. P. & S. S. M. R. R. FOR INTERCHANGE TRAFFIC WITH LAKE LINES.[1]

| Building | Length | Width | Square Feet Floor Space |
|---|---|---|---|
| Shed "A" | 208 | 80 | 16,640 |
| Shed "B" | 1005 | 80 | 80,400 |
| Dock roofed but not enclosed on sides | 1213 | 80 | 97,040 |
| | | | 194,080 |

NOTE.

Shed "B" is provided with Carriers on which package freight is handled from cars to steamers which gives quick dispatch and lands freight at Steamer's gang-ways.

CHICAGO WAREHOUSES OF WESTERN RAILROADS USED FOR INTERCHANGE TRAFFIC WITH LAKE LINES.

| Railroad | Style | Length | Width | Square Feet Floor Space | Location |
|---|---|---|---|---|---|
| C. R. I. & P. | Frame and Metal | 250 | 40 | 10,000 | 13th St. & So. B. |
| C. R. I. & P. | Frame and Metal | 280 | 50 | 14,000 | 16th St. & So. B. |
| C. R. I. & P. | Brick | 600 | 50 | 30,000 | South Chicago |
| C. B. & Q. | Frame and Metal | 700 | 45 | 31,000 | 16th St. & So. B. |
| C. M. & St. P. | Frame and Metal | 350 | 60 | 20,000 | So. & No. Forks |
| C. & A. | Frame and Metal | 300 | 60 | 18,000 | Van Buren S. B. |
| Ill. Cen. | Frame and Metal | 600 | 25 | 15,000 | Mouth River |
| C. & N. W. | Brick | 300 | 30 | 9,000 | State St. & So. B. |
| A. T. & S. F. | No Warehouse | | | | |
| Wabash | No Warehouse | | | | |
| C. & G. W. | No Warehouse | | | | |
| | | | | 157,500 Sq. Ft. | |
| Deduct space used for other than Lake Lines. | | | | | |
| C. & N. W. 30 x 100 ft. used for fruit auction | | | 3,000 | | |
| Ill. Cen. R. R. 10 x 100 ft. used for tracks under cover 100 x 10 ft. | | | 6,000 | 9,000 | |
| | | | | 144,500 Sq. Ft. | |

## Western Railroad Docks, Warehouses, Facilities and Methods of Handling Traffic Interchange With Lake Lines

**Atchison, Topeka & Santa Fe Railway:**

No warehouse. Dock on private slip South branch Chicago river six miles from mouth, 3½ miles beyond other Western road docks. Traffic is handled over an open platform 280 feet long, 8 feet wide, 35 feet from edge of dock. There are three runway platforms to dock edge, two only are used by boats; depth of water at dock of about 14½ feet; 6 cars are spotted at a time; switching is performed by the Chicago River & Indiana Railway, six-hour notice required to secure cars; switching service people can handle three cars an hour; west-bound when delivered to this road must be loaded direct to cars, although most all of the west-bound business for this road is teamed from the lake lines city docks by Santa Fe's Teaming Company at their expense; cannot work after dark; no light; no telephone communication, no office; boat is out of communication except by messenger while at docks.

**Wabash Railroad:**

Now has covered platform; no office; no telephone; no light; 280 feet frontage, 24x14 wide; 14 cars can be spotted.

**Chicago, Burlington & Quincy Railroad:**

Metal sheather warehouse, 700 feet long, 45 feet wide, containing 31,500 square feet; dock private slip, South branch of river, not accessible to boats over 320 feet long; bridge of the St. Charles Air Line Railway and width of the river at this point preventing longer boats getting in slip; only half of the line boats can get to this dock; can spot 20 to 24 cars; all east-bound is handled direct from cars to steamers; warehouse is reserved for west-bound and storage, making the work of handling east-bound through house to cars oftentimes slow and expensive; house is lighted and is among the best facilities offered by the Western roads; six-hour notice required for setting cars, about five cars per hour handled.

**Chicago, Milwaukee & St. Paul Railroad:**

Warehouse metal sheather irregular in shape about 330 feet long, 60 feet wide; about 20,000 square feet floor space; electric lights; the greater volume of the east-bound business of this line is handled via Milwaukee, so they have room to unload a few cars into house; three hours' notice required to get cars; three gangs of men can handle 120 tons.

**Chicago, Rock Island Railroad:**

Warehouse, Chicago river at 15th street; brick house, 280 feet long, 50 feet wide, 14,000 square feet floor space.

Warehouse, Chicago river at 13th street; frame and metal sheather, shed 250 feet long, 40 feet wide, 10,000 square feet.

Warehouse, Calumet river, South Chicago; brick warehouse 600 feet long, 50 feet wide, equaling 30,000 square feet.

Fifteenth street is lighted and fairly convenient; 18 cars can be

spotted; 18 additional cars placed on the load can be quickly spotted when first 18 are empty, average 7 cars an hour.

Thirteenth street house, 13 cars can be spotted; in refilling the track daily reduces the cars per hour handled to about 5; orders must be placed for cars three or four hours in advance of steamer.

The South Chicago house is on a private slip 900 feet long, and has the best facilities furnished by Western roads; the house is all doors, both water and track sides; three tracks alongside house; 30 cars are spotted; they are fairly prompt in switching cars; three gangs handle 200 tons per hour; east-bound is not unloaded into the houses on the Chicago river, but occasionally in the one at South Chicago.

**Chicago Great Western Railroad:**

East-bound traffic handled over two open platforms direct from cars to steamer, at Harrison street and 13th street, both on South branch Chicago river; 13th street dock is where we handle east-bound business; 28 cars can be placed on three tracks; switching fairly good; no light; at Harrison street 4 cars per hour and at 13th street dock 7 cars are handled; only one boat can work at the 13th street dock, two boats at Harrison; the west-bound business is tracked through empty cars to their in-and-out bound city freight house.

**Chicago & Alton Railroad:**

On the South branch, Van Buren street, 630 feet dock frontage, 8 feet to 90 feet wide; there is a shed on property 300 by 60 feet, 18,000 square feet floor space, used for receiving west-bound freight; the east-bound freight is handled over the open platform direct from cars; occasionally they set cars at house; no east-bound is unloaded into the houses; 13 cars can be spotted at the open dock and 9 at the shed; switching services fair, but is interfered with by tracks leading into the Union station; engine doing lake switching also does passenger and express switching, which is given preference; we can handle 13 cars from 2 to 2½ hours, but lose an hour between switching; three gangs of men will average about five cars an hour; five hours' notice required for cars; dock is fairly well lighted.

**Illinois Central Railroad:**

Warehouse on private slip mouth of river, 600 feet long, 35 feet wide; however, 10 feet of width of the house is used to spot 13 cars of east-bound, so that actual space is 600 feet long, 15 feet wide, or 9,000 square feet floor surface; east-bound is handled direct from cars to boat; west-bound is handled on the floor of the house; in switching east-bound cars from Randolph street to South Water, two long blocks, the street on which the city freight house faces is crowded with teams all day; it is no uncommon thing for an engine to take one hour getting through this congestion, so the switching is usually very slow; engine doing switching also takes care of the city out-freight house, which is always given preference; three gangs can handle about 4 cars per hour; five hours' notice is required for spotting cars.

**Chicago & Northwestern Railroad:**

They have about 800 feet dock between State and Rush streets; the warehouse is used for lake purposes; it is 300 feet long and 30 feet wide; however, one-third of the house is used as a fruit auction warehouse, so that actual floor space is only 6,000 square feet; only west-bound is handled in this house; east-bound is handled direct from cars to steamer; 8 to 9 cars can be spotted at the house; this year they built a platform on the remainder of the dockage front 450 feet long, 12 feet wide, where 17 cars can be spotted; three gangs of men can handle 6 cars in an hour; switching service is irregular on account of congestion and lack of tracks; 24 hours' notice is required for placing of cars.

The volume of water-borne traffic passing in and through Chicago is in no way in proportion to the tonnage that Chicago would have, had it facilities to properly handle such traffic, and these facilities properly arranged to cheapen the operating and terminal cost, inducing the building of increased size boats that should be in the package freight business, so as to make Chicago the commercial city of the world. With the completion of the Erie canal, running from Buffalo, N. Y., to the Hudson river, which is expected to be finished within the next four or five years, there will be an immense volume of traffic from the seaboard to move through this cheap waterway in thousand-ton barges. I believe the economical way to handle this tonnage is to trans-ship it at Buffalo in 10,000-ton steamers, instead of attempting to bring thousand-ton barges direct to Chicago, and I believe this will be the way the traffic will be handled when that time comes; and unless Chicago changes her slow and indifferent methods toward water-borne traffic, you may expect to see that traffic move through other lake ports.

Naturally, your Commission wants some statistics as to the package freight traffic moving through various lake gateways. I will attempt to give you, approximately, these figures. The east-bound traffic moving through various lake gateways in 1907, consisting mostly of flour and grain products (there was very little other traffic moving east-bound, the differential fixed between the all-rail and lake-and-rail routes making the lake rate unattractive); Chicago handled approximately 638,000 tons, Milwaukee 350,000 tons, Manitowoc 25,000 tons, Gladstone 135,000 tons, Duluth 510,000 tons. About 95 per cent of the east-bound tonnage moving through Chicago comes from points west of Chicago, the small differential practically killing the Chicago business for lake-and-rail shipment. The Chicago traffic is handled by eight lines and ten Western roads. You will note the Duluth tonnage is about the same as the Chicago figures, and this is handled by three Western roads and three lake lines. The two railroads at Milwaukee, you will note, handle almost as much as the ten Western roads at Chicago.

The west-bound tonnage moving via the lakes is of a more general character, but consists principally of fourth, fifth and sixth class freight. Chicago handled of this traffic 550,000 tons, Duluth 325,000 tons, Milwaukee 350,000 tons. About 21 per cent of the Chicago traffic moved west of Chicago; this equals about 110,000 tons; and was handled by eight lake lines and ten Western roads. Eighty per cent of the Milwaukee

tonnage moves west of Milwaukee, or about 200,000 tons, which is handled by eight lake lines and three Western roads. About 80 per cent of the Duluth tonnage moves west of Duluth, equaling about 280,000 tons, and is handled by three railroads and three lake lines.

Now, with all this information, which can be readily confirmed, you will see that Chicago is laboring under a great disability in inducing water-borne traffic through this gateway. There is a combined influence of shippers and carriers which forces traffic through other gateways, because of the cost of handling and the delay to traffic through Chicago.

I also believe that the loss of tonnage to the Chicago interests by those conditions has created the Southern and Canadian routes in competition for seaboard traffic, which would move through the Chicago gateway if the cost of transportation could be cheapened to admit of lower rates.

I am in favor of an outer harbor, because I believe that the Chicago river and its branches cannot be economically widened to 300-foot channel, which, in my judgment, would be necessary to enable boats of 60-foot beam to lie at docks on either side of the channel and permit the passage of two boats in the channel. I admit that these are extreme cases, but the condition is bound to exist if the larger sized boat is used for the purpose under discussion. Furthermore, the movement of the larger sized boats from the mouth of the river through bridges, no matter how modernly they may be constructed, necessitates expensive tug bills and steamboat time. There is no place abroad nor at the seaboard where large steamers are used to distribute freight; freight is usually handled at one point from and to steamers, and then distributed by lighters to its final destination; and no matter whether there is an inner harbor or an outer harbor, this method will unquestionably be pursued in the handling of freight carried by the larger type boat. Therefore, I believe the harbor should be at a point of least resistance in operating the steamboat, for the lighterage expense will be no greater from an outer harbor than from an inner harbor.

A breakwater extending from Lincoln Park to South Chicago unquestionably would be a nice thing for Chicago, but as I understand it, the government would not build such a breakwater for the protection of park property, and there are a great many people of the opinion that there is no necessity in creating a commercial harbor to use any of the property from the south pier of the main river to Jackson Park, and from my viewpoint I agree that the city and state should continue to reserve that portion of the lake front for park purposes. Chicago should never tolerate a manufacturing or industrial harbor which would disfigure its water front, but there can be no such objection raised to a commercial harbor.

Mr. Eckstrom, a prominent architect, has kindly made some plans, which I will leave with you, showing my ideas for a commercial harbor, which can be immediately available at no great expenditure. The idea is to ask the government to extend a shore arm from Lincoln Park out to the present breakwater, having openings at both ends of the piers. This would give a harbor of good dimensions for the refuge of vessels. Extending from the shore out into this harbor would be piers 2,400 feet in

length. On these piers would be built warehouses 80 feet in width, which is conceded to be the most economical width house for the handling of freight; the slips between piers to be 280 feet wide, and the streets in the center of the piers to be 100 feet wide.

Th idea is to use one of the piers for the so-called Lake Michigan lines; another pier for the use of the so-called standard lake and rail lines for city freight; the other three piers to be used for handling railroad freight trans-shipped at Chicago, the freight to be handled between the roads and the steamboat lines by car ferriage. The plan, of course, would necessitate the use of the river for car ferriage. Each Western road now has facilities on the river which could be readily turned into slips for the reception of car ferries. However, I cannot say that I am in sympathy with handling lake and rail interchange traffic with the Western roads by car ferriage. I believe it would be preferable to handle all interchange traffic with the Western roads at South Chicago; piers to be arranged similar to those in this place, where the steamboats could deliver and take such traffic from the Western roads, and I believe grain, coal, lumber and all other coarse freights should be handled at South Chicago in an outer harbor.

The proposed piers have a dock frontage of 25,400 feet. At the present time less than 8,500 feet dock frontage is used by the lake lines for city and interchange railroad freight. Furthermore, these modern facilities will enable the steamers to handle 5,000 tons per day per steamboat, where with the present facilities 1,200 tons per day per steamboat is a maximum. The increased quantity of freight that modern facilities would enable the lines to handle would, of course, use the dock facilities to a greater extent than they are capable of being used today. I think I am safe in saying with 25,400 feet of dock frontage located as shown in these plans, the present lake lines handling package freight in and out of Chicago would be capable of handling ten times as much freight daily as they are capable of handling with the present facilities. If it is decided that South Chicago is the most advantageous point of interchange for railroad traffic, it would leave this 25,400 feet dock frontage for the use entirely of city freight, and the most northern pier might be used for passenger traffic.

I believe, however, that the proper solution of the passenger traffic question would be to extend the south pier, giving it outer protection and making the pier double deck, permitting the transportation facilities and carriages to come on to the pier at grade—the passengers to be handled to and from the vessels on the upper deck of such pier; and I believe this pier should be large enough so that it could be used for a recreation pier.

However, this is a subject that I am not as much in touch with as I am with the package freight topic.

Mr. Wacker—You spoke of lighterage service. Some people claim it is too expensive, because of the double handling.

Mr. Johnson—I happen to know that the gentleman who is taking hold of it now, Mr. Pugh, is practically eliminating the handling question. He has got a big truck. That truck is shipped into the warehouse and put into the lighter and the truck is put on the railroad, so there is

no more handling there than there would be in teaming. I am talking about modern lighters; I am not talking about the makeshift things used today.

### MR. GEORGE MARCY,
### President the Armour Grain Company.

I may not know exactly what you really are after. I may wander a little bit. In the first place, I represent what is known as the Chicago river interests, so that I am quite prejudiced in favor of making the Chicago river a navigable channel for any size boats there are on the lakes. As a citizen of Chicago, disregarding my business, I am very much opposed to seeing the lake front taken up as a harbor, for the reason that a harbor brings all kinds of manufacturing industries, rolling mills, coal yards, freight yards and manufacturing institutions and one thing and another. I feel that is a bad thing for two reasons. In the first place, I think it will have a tendency to ruin our city, because we have to run so many freight trains through the town that the number of tracks will bring disaster to the whole town, unless you go underground. If you go underground you will have to have so great an extent of it that the expense will be enormous and you will destroy the city, and tend to take the business away which is established away out in the other parts of the city.

Another reason why I am very much opposed to using the outer harbor for business purposes is that I think that it is Chicago's great opportunity to develop that as a playground and attraction to the whole Western country. Every man, woman and child all through Illinois, Indiana, Wisconsin, Iowa, Nebraska, Kansas and that section of the country will drift in here to Chicago from time to time. The first thing they want to do is to go on to that lake. I believe that the lake front ought to be worked out on a passenger proposition and a playground, and a big playground. I think that business there ought to be discouraged and nothing done there that would tempt business. I think the city should construct large docks, those docks to be leased out for landings to boats which will take out a license and operate under a city license, operating under the control of the city, not only in the harbor, but out on the lake. It will also serve to take our immense laboring class of people out on that lake in the evenings, afternoons, Saturday afternoons and Sundays, and get them out of the hot part of the town to the lake where they will enjoy themselves instead of sitting around saloon corners drinking beer. They will get their families out on these boats. If the city built docks and encouraged that kind of business, I think it would do a lot of good.

As regards the Chicago river. In a rough way I don't believe the general public realizes the improvements which have been made in that river within the last five or eight years, the immense amounts of money that the Drainage Board have spent in the improvements they have made and are still making. Besides that, the traction companies have removed three tunnels. The city has built a few bridges. Besides the railroad companies are building new bridges, and I think that the money that the different authorities have spent in improving the Chicago river

within the last twelve years must be in the neighborhood of twelve or fifteen million dollars. I also think for about five million dollars more on the part of all of them it will make the Chicago river, both the Main branch and the South branch and the North branch, just as good a stream as there is anywhere around the Great Lakes, and vessels of any size will be able to navigate them. Just as soon as that is done, the Chicago river and its different connections, away up in the North branch, and all down the south on the South fork, and what is known as the West fork, and also for thirty miles along the Drainage canal, on two sides, provides dock property such as no other city on the Great Lakes has. There is no reason why it should not be taken advantage of. Up to the present time there has been no encouragement to take advantage of it, because a great many of the improvements which have been made have been made up the stream and not done, as one captain put it, "at the neck of the bottle." The city council last year rather disappointed us—when I say us, I mean the River Improvement Committee—by not making appropriation for bridges, as we suggested they should. They have been most backward in appropriations for improving the Chicago river. They have, to be sure, put in some new bridges, but those new bridges have been built at extremes, away up in the North branch and out of the way places, more than they have in the Main branch at the neck of the bottle, although the city is now building a new bridge at Kinzie street, and the Northwestern and St. Paul are building each one. When the last appropriation bill went through, they economized in the way of bridge money, which, of course, will retard the improvement of the Chicago river just that much.

The Drainage Board, in spite of the criticisms against them, have done and are doing everything that any taxpayer could ask the Drainage Board to do. They have bought property just as fast as they could buy it and get it right. They have not rushed in, because a man wanted $1,400,000 for a piece of property, as they did for that property south of 12th street, and paid it, but the Drainage Board sat back and tired them out until they could buy it, and they have bought it for about $800,000, and saved the city a great deal of money. There was a little clamor to go ahead and buy it, but Mr. McCormick and the Drainage Board held back until they could get that property right.

As to the things to be done in the Chicago river, I want to say right here that I disapprove of the agitation for 200-foot draws. It is impractical and it is not needed. A 140-foot draw, which is the draw established by the government, or about 140 feet, is plenty wide enough. If necessary, two boats, the largest boats in the lakes, could pass in a 140-foot draw, though they must provide by-passes to take care of the surplus water. If they have draws beyond 140 feet they will not do anybody any good. It will cost a great deal more money to get a bridge, which will delay us getting bridges. There is no object in having a 200-foot draw for the purpose of letting a boat lap over, therefore I cannot see any argument why people want a 200-foot draw, when 140 feet and by-passes for the water will do.

In the Chicago river we are, of course, all right as far as Rush street. At Rush street that center-pier bridge has to be removed, and

there is a bend which ought to be eliminated. The bend will be all right as it is when the Rush street bridge comes, for probably 80 or 90 per cent of the lake tonnage, but probably 10 per cent of the freight would have trouble in getting through Rush street and making that bend; therefore, on the north side of the river, west of Rush street, there should be a cut put in there to eliminate that bend. The next center-pier bridge is at Clark street, which, of course, has to come out, and then Wells street. When the Wells street center-pier is out, and the Lake street pier is out, if a part of that point west of the Wells street bridge were cut off, so as to provide a winding basin, it would be a desirable thing. I would very much like to see a bridge put in at Orleans street, but at that point, on account of the bend, they will have to have upward of 200-foot draw. Colonel Bixby has gone into that, and says that the plans are in such shape that if the Wells street pier is taken out it will take care of the largest boat on the lake. If that property west of Wells street could be cut out and a turning basin provided in there, it would be an extremely desirable thing for passenger boats. It is not neded for freight, because any freight boat in the future which comes in the Chicago river does not care to wind there. A winding basin in there would be very desirable for passenger boats, if they come up the river, which is a nice place for them to wind.

Going up the North branch, the Milwaukee & St. Paul and the Northwestern and the city are building bridges at Kinzie street. When those bridges are built there will be a 130-foot draw with by-passes for the current which will provide as wide a channel as is necessary, and we can get as large a boat as there is on the lakes up there.

The next street is Indiana. That draw is too narrow for us to get through, and we have to have a new bridge there as soon as possible. It is a pretty old bridge. It will prevent any decent-sized boat going up the North branch even after Kinzie street is finished.

The next bridge is at Erie street, which is a broken bridge. That collapsed, so the city must build a new one there. Last year we tried very hard to get them to make an appropriation for the Erie street bridge, so as to start it and get that completed while they were building the Kinzie street bridge, and then go ahead with the Indiana, but the council cut it down to $15,000 repairs for the Erie street bridge, and it collapsed, and now they have to build a new one.

There are one or two center-pier bridges which interfere to a certain extent, which, of course, have to come out. They have pretty wide draws at the present time, and if Indiana and Erie streets are out, we would not have much trouble.

On the South branch Lake street center-pier has to come out. Madison, Adams, the Metropolitan Elevated, Van Buren street, the Drainage Board will have to take out. They will have to take out that power plant to widen the river south of Van Buren street. They are trying to buy that, and in the course of time they will buy it. It doesn't prevent a large boat coming up, but it causes a very swift eddy, which makes it very dangerous work to handle it. There are several pieces of property south of that which the Drainage Board are figuring on buying, and I presume before very long they will buy them. We are all right

as far as 12th street. At 12th street they have promised to put in a new bridge and take out the center pier. They are also at work cutting property out south of there. That puts everything good and clear to the St. Charles Air Line bridge. The C., B. & Q. have promised us as soon as improvements were made at the head of the river so that the St. Charles Air Line bridge was in the way, they would take hold of that and fix it. The only other obstruction, the Stewart avenue bridge, the Pennsylvania Railroad have let a contract for a new bridge there. When those improvements are made that I have enumerated, together with the few pieces of property which the Drainage Board have figured on buying, we have then got in Chicago, both on the North branch and South branch, clear down to the Drainage Canal, as good a channel as there is on the lake. I won't except any, I don't care where it is; you have as good a channel, and of dockage there are so many miles of it; there are so many opportunities for immense coal docks to be built, elevators to be built, and manufacturing plants which will be built as soon as these bridges are out and the obstructions so they can see they can get boats in there, they will start building. There is no encouragement for any one to build today.

We lost two elevators by fire a few days ago. The Iowa elevator is being torn down by the Drainage Board. Two years ago we lost another elevator at 22d street. We have no more idea of building on the Chicago river than we have of falling out of the window, unless we see those improvements started, but the moment those improvements are started it will encourage anybody to build elevators, and modern ones at that. It will also encourage large coal docks to be built. There are not a dozen coal docks on the Chicago river today. The coal is handled in Milwaukee, for the reason they have opportunity to handle it. There is no encouragement for a coal company to come in and build, consequently we don't get coal. When that coal cannot come in we lose business. If you put your harbor on the lake front and attempt to provide those coal docks, in the first place you have hardly got the room. In the next place, you have to get your freight trains out there. In the next place, you have to spoil the artistic position of the whole city. Out on the Drainage Canal, those 30-odd miles, on that strip of property they can put any number of coal yards, elevators, iron works, or anything else that wants to go out there, disregarding whether your deep waterway comes or not. If the deep waterway comes, so much the better.

I have not mentioned the improvements which are necessary on the South fork and the West fork. Those are parts of the river which, as they fix them up, makes a very desirable part of the city for all kinds of dock property.

Mr. Sikes—Would better river facilities tend to keep grain here?

Mr. Marcy—The only reason why it is tending to move away from you is because there has been no encouragement for anybody to build elevators, and it has been so hard on them. We have a serious time getting boats handling our business, for the reason we cannot get anything into the Chicago river carrying anything more than 125,000 bushels, and that class of boats are going out of exist-

ence. They are building a larger size boat of 250,000 bushels. Some of them carry 400,000. In the Chicago river we cannot get anything carrying more than 125,000 bushels, so that it discourages many from building anything on the river. Just as quick as the people in power take hold of the thing and make those few improvements, then you will encourage building, and I have no doubt in my mind there will be a number of elevators built and a number of coal docks. Coal docks are the most valuable improvements that the city offers, more so than elevators, because boats bring coal in and bring in an immense amount of tonnage, and that tonnage causes the merchandise to come this way.

Mr. Conover—It is 10 cents cheaper to carry coal to Milwaukee than to Chicago.

Mr. Marcy—That is because the boats can get into the Milwaukee river better than they can here. You fix your river so that the same size boats can get in here and it will take all of that business, or 80 per cent of it, because the facilities are so much better in the way of all kinds of labor. You can always get labor here. You take a coal yard here, located at some point on the South branch where there are three or four railroads which they can ship stuff on, while at Milwaukee they can only ship on the Milwaukee & St. Paul and the Northwestern. It is the same with grain. If I have my elevator at Milwaukee, I bring in my stuff on the Northwestern or St. Paul, but not on the Wabash or on the Santa Fe. If I happen to be in Kansas, that same thing works. A Kansas City grain man, working on the St. Paul road, on account of being able to work his stuff through Milwaukee, and the Milwaukee road being anxious to get cars into Milwaukee, can get the cars, and can do his business through Milwaukee, so that if the Wabash later on comes to us to give them business to Chicago, we cannot compete and bring the business over the Wabash or Rock Island or those roads from Kansas City, because the Milwaukee & St. Paul through Milwaukee can beat them out. A coal cargo will go to Milwaukee because the boat can get in there. If you try to get a boat into our river, you can't do it.

## MR. WILLIAM M. HOPKINS,
### Manager Transportation Department, Chicago Board of Trade.

What I shall say in relation to transportation by water will be in a general way predicated on this statement, that whatever will reduce the cost of transportation by water will of necessity attract more business to Chicago. As Mr. Marcy has indicated, you have not the facilities here for doing business in the harbor that you ought to have, so that the larger vessels can come in here. Rates are lower by gateways like Milwaukee, Kewaunee, Green Bay and Manitowoc than from Chicago, for the very reason that the larger vessels can come in there, and they get return loading in the commodity which is most attractive to a certain class of vessels, and that is coal loading, west-bound.

The distribution of coal in the Northwest is something like this: As far south as the line of Minneapolis & St. Louis Railway, running from Minneapolis to Fort Dodge, and then to Omaha on the Northwestern, on that line, in North Dakota, South Dakota and Minnesota

the distribution of coal is very largely from Duluth. Some exception would probably be found in that statement in the movement via St. Paul and Northwestern roads when they are taking cars northwesterly and Northwest grain will be returned in them. The result will be lower rates in their favor, but in that event the coal is not going through Chicago, but from Milwaukee and Manitowoc; but generally speaking, the distribution of coal through the Northwest is through Duluth. There is a tremendous coal tonnage passing from Duluth docks to the Northwest and to Minneapolis mills.

Coming south of that line, the coal is distributed through Green Bay, Kewaunee, Manitowoc and Milwaukee, supplying very largely the West through Omaha, through the Missouri territory at Kansas City. The distribution of coal west from Chicago is very limited.

The Northwestern Fuel Company a few years ago established an office in Chicago. For a great many years their principal office was in St. Paul, while they had docks in Duluth and Green Bay and Milwaukee. Their main office was in St. Paul, and they moved their main office down here, not for the purpose of distributing lake coal through Chicago, but for the purpose of handling their all-rail coal—Illinois coal and the Eastern coal moved by rail. The very large percentage of the Northwestern Fuel Company's business today is distributed, as I have above outlined—that is, their lake business—by Milwaukee or Duluth.

Mr. Delano—Can we expect to distribute western Virginia, western Pennsylvania and eastern Ohio coal through Chicago?

Mr. Hopkins—You could not distribute, say, to the Northwest into northern Minnesota or Dakota, but you could distribute through the states of Iowa and South Dakota and Nebraska. Nebraska trade is now divided between Lake Michigan and Lake Superior ports. You could get the Kansas City business that now goes in there from Milwaukee. Western coal is very largely handled through Milwaukee. With facilities here for handling it as cheaply as other gateways, there is no reason why we should not do it. We draw grain from territory where the rates are 2 and 3 cents against us. We do it because we have two advantages: The first, a natural advantage by reason of our lake transportation, which ought to be, but is not, very much advantage this year. The largest by reason of the enormous investments and facilities. Sixty-two million elevator capacity here will enable us to store an immense quantity of grain. Having the facilities to do the business, we do it cheaper, and therefore can stand some disadvantage. If you have the facilities for handling coal west-bound in your docks, you are bound to get a larger return east-bound, and one thing would add to another. Your merchandise would be distributed here, if you could bring it into the Chicago river, or any other place you have developed. The Chicago river is preferable, because you have opportunity here for distribution to the railroad companies. Briefly, Chicago has very few freight-receiving and forwarding houses. If you had your facilities along the river it is going to relieve your congestion with the railroad companies to a large extent.

To go on with the point in regard to lake facilities. To illustrate what advantage increased facilities by lake might be. I will just illustrate in this way: All rail carriage from Chicago to Buffalo, with comparatively few exceptions, belong to systems; that is to say, the Pennsylvania system and the New York Central are substantially the large carriers by rail. The Wabash terminates at Buffalo, and the Grand Trunk, and so forth, use these big systems trying to attract the through rates. Last year and again this year they raised their rate on grain largely from Buffalo, so that the reduction on grain to Buffalo by the tramp steamers was not sufficient to offset the advance. The result is that the through rate by rail of itself is 5 cents lower than it is by lake. You would not move any of it this year except that there is an abnormal Canadian production this year. If you increase your east-bound movement, that adds to the west-bound movement. Every cent you spend in increasing the facilities here means a reduction in the cost of carriage, and that means a greater flow of trade in both directions, because freight business or any business will follow the natural law of seeking the outlet of least resistance.

From a Board of Trade standpoint and from the standpoint of one familiar with the movement of traffic in the Northwest for a number of years, I can see where it would be of tremendous advantage to Chicago to decrease the cost of transportation through the city of Chicago. Any way you do, it does not matter, whether you select this harbor or that harbor or some other method, so long as you accomplish that result, you are going to do more to build up the city of Chicago and its business. There is not a bushel of grain, there is not a package of freight that will go through this city that does not have to pay tribute some way or another. It doesn't take very much of a difference in your freight charges to move a tremendous quantity of grain or any other item that moves in so large quantities as grain and coal and those things. A quarter of a cent per bushel often decides the movement of a half a million or a million bushels of grain, and those things are of tremendous influence.

Just one word more: I believe the tendency is for business generally to go around Chicago today. I believe we are losing a large part of our grain trade, as Mr. Marcy said, to Milwaukee and other lake ports, because of the difficulty and the cost of getting it through here. The railroads would prefer—those few lines in Milwaukee prefer—to take the grain to Milwaukee, because it would cost them less. Congestion of traffic here, and the cost of movement of cars, delay in Chicago and the lack of adequate facilities in your harbor, and all those things go to make up a very large sum in the aggregate that transportation has to pay in going through Chicago, so I think the tendency is very evident to move your grain east-bound through other ports, and bring your bulk freight back that way, if it can be done. That is all against the interest of Chicago. I see no reason why it should not be remedied.

## MR. LYMAN E. COOLEY

I presume it is a matter that everybody has noticed that the Almighty has located all the waterways alongside of the big towns. This came to me as an original discovery about thirty years ago. I was on the river and harbor service for a long time and made a statistical comparison of the location of city population in the United States. I discovered that 75 per cent were upon waterways that were navigable and 90 per cent upon waters which had been recognized by the appropriations bill. Improved means of land transportation feeds the water side. The more railways we build and the better highways we build the more we stimulate the growth of waterside cities at the expense of inland cities. You will find that that applies in regard to railways. Take the statistics of Ohio, Illinois and Indiana. All of the little hamlets are disappearing in favor of large towns, where they can get a larger market and larger opportunities to purchase.

I took up a few years ago for the Deep Waterway Board the question of the conditions under which rail commerce would transfer to water. We spent several thousand dollars of Uncle Sam's money in that investigation. It involved the question of a long and a short haul. It was a matter contended for in all the legislative bodies of the United States that the freight rate should be based on a mileage rate, whereas every railroad man contended that there was an arbitrary involved by which the cost of the short haul was larger in proportion than the long haul. I worked out that arbitrary for the sixth class, which is the pooled class, which would amount to a 250-mile haul; in other words, a haul of 250 miles. One-half of that would represent the arbitrary and the other half would represent a rate per mile. On a haul of 500 miles, a third of it would be arbitrary. A haul of a thousand miles, a fifth of it would be arbitrary. The point I was getting at, in a haul of a thousand miles, the arbitrary would be equivalent to 200 miles, and the proposition of the railways, which they have not been able to defend fully before the Interstate Commerce Commission, is purely an economic condition based upon facts which they have not themselves fully recognized, but which could be sustained. The logic of that proposition is, and the tendency of all railroad regulation is, to route traffic from the point of origin to the point of ultimate market, and not stop at intermediate points. If you couple that with the first proposition, it is this: As long as we are producing a surplus to be shipped abroad our present scheme of transportation differentiates away from the interior city, and the ultimate effect is to concentrate our city population at the point where the re-shipment is last to occur on its journey abroad and to deduct from the inland markets and the city population of the interior. I think we all recognize that tendency without being able to give reasons for it, to a certain extent.

There is no remedy for such a condition, except to move the sea to the interior, because you cannot take the interior to the sea.

In this same investigation I made a study of the movement of waterborne commerce in the United States. I was particularly concerned

about the Great Lakes. I routed the wheat crop, corn, anthracite coal and the ore of that year from the point of origin to the point of destination and the proportion of cost for transportatin in that year was 27 per cent. The transportation on the Great Lakes measured in ton miles 27 per cent of all the railways in the United States. If you add to that the Erie canal traffic and the Hudson river traffic and Lake Champlain, it makes over one-third. On the Ohio river alone there is 32½ per cent of the ton miles of all the railroads of the United States. Our interior rivers did not show up in the aggregate so strong as the lakes, amounting to about 15 per cent. The coastwise commerce is not very great, and that added to all the other water-borne commerce made a ton mileage of 87½ per cent of that which comes by rail in aggregate ton miles.

I refer to that, as it is a popular delusion that there is no such thing as domestic water commerce in the United States, when, as a matter of fact, it represents a ton mileage of seven-eighths of the rail traffic in the United States. I went into a further fact, which is the foreign trade, and routed all the exports and imports from the point of origin to the port of destination, and I found in the over-sea trade the commerce in ton miles would be 17-10 of all the railroads of the United States. Taking an aggregate of the two, the water is performing a service for the United States of two and one-half times of that performed by rail. I speak of this in order that people should not habitually refer to it, and people should not get pessimistic on the subject of water improvements.

I want to speak, however, of what everybody recognizes, for a moment, and that is the apparent decay in the use of our water routes, which is particularly noticeable upon our Western rivers, and on the smaller canals of the country. In 1868 John G. Stevens of New Jersey wrote a pamphlet upon water and rail competition. John G. Stevens died in 1884, a very old man. I had a great deal of correspondence with him. He built the New Jersey system of canals. He also built the New Jersey Central Railway. Mr. Stevens made a careful comparison of competition by water and rail and reached the conclusion at that time that a steamboat, to maintain competition with railroads in the future, would have to have a capacity of not less than 680 tons. That was equal to the largest train which Mr. Stevens at that time foresaw. Mr. J. B. Jervis concurred in that opinion. Both of these men were old waterway engineers, Nestors in the construction of waterway systems. That matter appealed to my judgment. I took the matter up and have made three or four investigations on the subject. I wrote an essay upon the matter as early as 1888, in which I placed the limit at a thousand tons, and again raised it in my Cleveland address to 1,500 tons. It was not at that time, as it is now, apparent how far the railroads would carry the train question—how far it was possible to develop traffic upon the track gauge of four feet eight and a half inches. I think it can now be said for several years past that the limit has been reached of track possibilities and of engine weights and of cars, and in the opinion of such men as Mr. Shields and Mr. Van Horn, we have to go backwards upon that question. We have gone too far. That being the case, with all the latter betterments made in our railway system in the last ten years, and since they have the money to do so, I think the limit ought to be at least 2,000 tons, using the criterion fixed by Charles M. Stevens.

I was advising engineer upon the investigation of the Erie canal expenditures in 1898, and I went to New York to speak on that subject and to give some advice there. I said they should make a canal for barge capacity of at least 3,000 tons, instead of 1,000-ton limit. Looking at that from the standpoint of Stevens and Jervis, we can see an ample reason why our streams which are only adapted to small craft have fallen into decay, as they have, and there are other ample reasons. Take the Ohio river and its tributaries, which has the largest commerce of any stream in the interior. There are ten of these tributaries; no two of them have the same size of lock or same depth. You might as well talk about developing a railway system and make it useful with eight or ten different gauges in the system. These streams are only useful a part of the year. They are not connected up with other waterway systems, so the reasons for the decay of commerce upon our rivers and the growth of the more nimble carriers is thus explained, but it is coming to pass in this country, and it has already come to pass in France and Germany, that with the growth of population there comes a renewed demand for the use of the waters on a larger scale that will make the waters available for all the months of the year.

France and Germany have each an area of something over 200,000 square miles, about equivalent to the area of Indiana, Illinois, Wisconsin and Michigan, or Illinois, Iowa, Minnesota and Wisconsin. Neither of them is better adapted to waterway systems topographically than this. Neither of them has the resources of these areas I have mentioned. They have populations of something like 20,000,000 in France, and between 50,000,000 and 60,000,000 in Germany. France has developed a waterway system of about 8,000 miles of interior waterways. By improvement of rivers, connecting the headwaters and by means of canals, with this water system she is able to do the work of that population with a railway system of 25,000 linear mines, about one mile of railway to each eight miles of territory. Germany has not gotten so far along, but has developed about 2,000 miles of waterways, or about one mile of waterway to about twenty-five miles of territory, and has about the same mileage of railways, 25,000 miles.

The fact that the governments are spending enormous sums of money for developing the waterway system is very significant, as Germany practically owns most of her railroad mileage, and France has her mileage under control with reversionary rights to the state after a period of, I think, fifty years.

Now, take a unit area, such as I have spoken of, a thousand miles from the sea, as we are here practically. You estimate the amount of railways required to do the domestic traffic, and then find the area itself; 25,000 miles, we will say, as in France and Germany. Proceed to put an additional estimate on the additional investment that is required to do the work of the surrounding units. Then with the haul down to the sea to trade with foreign ports, you will find that an isolated area of a few miles in the interior parts of the United States requires two or three times the investment it would if it bordered on the sea. We cannot maintain world competition on that basis. We already have in the Middle West a mile of railway to six miles of territory, and one-half

to one-third the density of population, and we are crying we have not enough railways. Mr. Hill says we need 125,000 miles more to do the work before us, as quick as the money can be found to provide it. My theory is that with the development of this waterway system we can do all the work of transportation that is required with practically the same mileage of railways per area of territory, and with the same area of waterways as in France and Germany.

In that connection I would call to your attention that of the 600 million tons of freight handled in the United States, 34 per cent of it is worth less than a dollar a ton at the point where it is produced; 17 per cent is worth from one dollar to two dollars per ton, and 10 per cent is worth two to five dollars per ton; in other words, only about one-third of the commodities moved in the United States are worth to exceed five dollars per ton. It will appear to you at once, if we are to develop the resources that we have and are to maintain ourselves, that we have got to have some cheaper means of transportation than the railway provides, for this raw material, and fuel and bulk commodities, because the cost of transportation to the man who uses our products is vastly more than the cost of production at the point where produced.

In 1897 I was a member of the International Deep Waterways Commission appointed by President Cleveland to consider the possibility of creating ocean navigation to the head of the Great Lakes, to Chicago and Duluth. We determined it was feasible to carry 30 feet of water from the Atlantic Ocean to Chicago and Duluth. Later a board of engineers investigated the proposition and investigated and reported the cost at about $200,000,000 to Montreal.

I have made a very elaborate investigation upon the cost of transportation. In that connection I concluded we could do the seaport work from Chicago for one dollar per ton with a properly developed outlet, and that we could do the Liverpool work at two dollars per ton, practically about half the present rate. In fact, I had a consultation with an iron man in which he admitted my conclusions that we could deliver, under the conditions in 1899, Lake Superior ore in the Midland District of Great Britain and sell it in competition with Spanish ores.

Three or four years ago I undertook a review for the Lake Erie ship canal proposition and concluded that if it was built on a practical basis, so that lake carriers could go to Pittsburg right into the coke and coal district, that we could produce pig iron about 20 per cent less than we are producing it for, and put us beyond the hope of world competition. Perhaps some of you don't know that the majority of ship plates used on the Clyde are American manufactured ship plates.

On this Lakes-to-the-Gulf proposition we started out pretty big on that on the idea of 14 feet in 1889. As the matter has since developed, it has taken the shape of a recommendation for 22 or 24 feet depth. I have had some conversation with people who are expected to pass upon this matter officially, and they say it is no longer worth while talking about the possibility between Chicago and St. Louis; that they admit, and are willing to state, we can produce any depth we please between the city of Chicago and St. Louis. The other section, between Cairo and St. Louis, that is a point that has to be investigated. The critical

part of the whole route lies between Cairo and St. Louis. The river has very steep slopes and it has an enormous flood volume. The most that has been hoped for, in connection with regulation works, with the present supply of water, has been eight or nine feet. With the Chicago water down, it would add about 25 per cent to low water volume, and with an additional amount from the upper river we might realize between ten and thirteen feet by proper regulation. The mean stage of the Mississippi for forty years has averaged about eight feet. Over half of the year you would have six to eight feet more. On the lower Mississippi a letter which I received a few months ago from Mr. Okerson stated that during the past year they had maintained 14 feet from Cairo to the Gulf throughout the season. They do that by some hydraulic dredging upon the bars each season, pending the time when the river itself shall be fully improved and in hand.

The levee people down on the lower Mississippi have come to recognize that the securing of the banks of the Mississippi is a necessary adjunct to the levee side or to maintaining or reclaiming the enormous tracts of alluvial land, where there offers a motive aside from the waterway question itself. When we have fixed the banks of the Mississippi we will get better results. In any event, we can say definitely it is practical to foresee 14 feet of water from Chicago to the Gulf of Mexico. It is practical to develop this end of the route down as far as the city of Utica as large as the water supply provided for in this main channel here, when it is completed, 24 feet, and 20 feet to the city of St. Louis. With such a provision the stages of water in the lower Mississippi and middle Mississippi would be sufficient to take that depth through for several months of each year.

I will not go into the commercial side of that proposition further than to put in one point, which I think will appeal to every American citizen, that if we can turn the products of our lake ship yards out upon the high seas, we can compete with foreign markets. That is worth what it would cost to the United States, in that proposition alone.

There is another point which it is worth while to call attention to, that the undeveloped part of the United States, that part which has more resources than all the country, that is yet unexploited, lies in the fantail to the south of us. Southern Illinois is not adequately developed. Southern Missouri scarcely at all, and the Indian Territory down to Texas, northern Louisiana, Mississippi and western Tennessee. We have scarcely a foothold in that country as compared to the other points of the compass about Chicago. We can do a good deal to develop that country to our liking by taking hold of this waterway question effectively.

Here is another comparison I would like to make in the point of this alluvial land below Cairo. There is about 32,000 square miles of that, which is four times as much land as was ever cultivated in the best days of old Egypt, yet Egypt is a matter that still occupies the attention of nations.

We might expand this proposition a little further to have the idea of a base line which shall eventually be developed on a deep water basis, extending from the Gulf of Mexico to St. Louis, 3,300 miles, to which is tributary every water course from the Alleghenies to the Rocky Moun-

tains, and there is no reason, so far as I can see, with the growth of engineering resources, why we should not contemplate the ultimate development of that for ocean navigation, of ships of ocean draft—for vessels of light capacity. I believe it can be done.

Aside from that, Illinois occupies a very singular position. She is the focus of all waterway possibilities on this continent. You cannot pass by lake level from the Great Lakes to the Mississippi valley except at this place—Chicago. There are other passes, from Green Bay across the Wisconsin and from the head of Lake Superior across to the St. Croix river, and the Miami across to the Wabash; three of them across the state of Ohio, two of which are occupied by a system of canals, but every one of those routes traverses the shores of Illinois. All of our water systems, whether you take the tributaries of the upper Mississippi and Missouri coming from the Rocky Mountains, the Ohio river from the Allegheny, the Tennessee or Cumberland, all abut into the shores of Illinois. It is not possible that a waterway be developed in the interior without Illinois being in a position of singular advantage. I think we ought to look forward to the time of this all coming to pass.

When we have a density of population equal to France and Germany, we will have about 400 millions between the Allegheny and the Rocky Mountains, and that is not so far in the future as many of us think, perhaps.

In the idea of the development of a waterway system Chicago will be at the crossroads of water transit. Illinois has a satisfactory reason for interest in this waterway question and for provisions for urging it upon the country, because, as I say, she is in a position of singular advantage.

To get down a little more to details: Take the waterway between Chicago and St. Louis, the Chicago Sanitary Canal, as it is. We have spent for that and other purposes something like $50,000,000—over $50,000,000. We have got a channel in the rock that is 160 feet wide and 24 feet deep, as far as widths are concerned, the largest channel ever built for ship canal purposes, although I think the Panama canal is 200 feet wide. The Kiel canal is 80. In the earth the channel is worked out with a depth of 202 feet on the bottom and about 300 at the water line, except the portion from here to Summit, about seven or eight miles, which requires a widening of 92 feet to bring it up to the standard of the earth channel as originally laid out, but the bridges have been built for the full width, and the right of way provided. This channel has a capacity of 15,000 cubic feet of water per second. That doesn't mean very much to the layman. I was consulting engineer for the Union Water Company at Denver and had occasion to look up the water supply of Colorado, and I am making a statement which is about substantially true. In the average year the water that runs off the entire state of Colorado is about the same as the capacity of the Chicago Drainage canal, to give you an idea of how little water they have in some of our arid states.

This water will fall from a range of about 146 feet from the end of the Drainage Canal to La Salle or Utica, which is at the head of the alluvial river on the Illinois. The Drainage Canal is developing a fall of about 40 feet. In the project of the Internal Improvement Commis-

sion there are four other falls provided for which will develop about 132,000 horse power.

On this scheme of a constitutional amendment of the authorization of a bond issue of $20,000,000, all of this sum is to be spent upon the development of this section from the end of the Drainage Canal to Utica, and contemplates, so far as it has been forecasted, that the state will secure all the flowage rights and other rights in the stream, eliminating the hydraulic parasites, build the dams, develop water power and own and control the same. The estimate is something inside of $20,000,000. It is considered that $20,000,000 will be sufficient.

If the locks are put down to a depth of 24 feet, it will cost $7,000,000 or $8,000,000 more, but it is contemplated that Uncle Sam should co-operate with the state and at the same time. Uncle Sam will be expected also to put in a dredging fleet and dredge the lower Illinois river. It is contemplated it can do that with a cost of a million and dig out a channel there, with an expenditure of $200,000 a year and keep it up indefinitely, and in ten or twelve years we will have 14 feet, and they can go on indefinitely. Assuming that Chicago is to provide the water supply for that 14 feet, a matter of considerable discussion, and about which there is some difference of opinion, Chicago will be in about two-thirds of the total cost of a waterway. At least two-thirds, from Chicago to St. Louis. St. Louis will be in about $20,000,000 for perhaps half the remainder and the United States about another $20,000,000, about somewhere in that proportion in round figures. All the information I can obtain is that the constitutional amendment will be adopted and that the next legislature will take the matter up with a view of preparing legislation in the premises. The financial scheme of the state—all the speeches that have been made by Governor Deneen and Mr. Lorimer—have been based on the idea that the state would not be requird to tax itself in any manner for this issue of bonds. It is simply a loan or credit, that the returns from the water power will recoup the state in various periods of time varying from 13 to 14 years, according to how they are applied, and provided a market is immediately available, as is assumed, for all the water power that will be produced. Assuming all of these things to come to pass as per schedule, the first proposition that the next legislature is going to be up against is to see that the water is provided. We are likely to have some legislation in that connection defining the water supply for this channel. It is also a necessary proposition to insure co-operation in Congress, in my opinion, that the state should not only define what it is going to do, but as to what its agents are going to do and what provision we are going to make for this water supply, and where we are going to obtain it, and whether the manner of obtaining it will be useful for waterway purposes. I think it can be said without much hesitation that the state will act in that matter, that it will advocate one channel to Lake Michigan in place of two, because one channel is useful for a waterway as compared to two, neither of which is adequate. It will be greatly to the interests of this section, from a waterway standpoint, that there be only one channel to Lake Michigan.

To take up the sanitary phase of the matter for a minute, we will get a different angle on it. We have one angle of the waterway system

—the dilution. The ratio as fixed by the sanitary law, or rather as originally stated by Mr. Hering, was 24,000 cubic feet a minute for each 100,000 inhabitants. Mr. Hering has since confirmed that in his report to the International Commission. As consulting engineer of the committee that fixed the law, I fixed it at 20,000 cubic feet of water to each 100,000 of population, and I fixed it at what I considered sufficient to take care of the population and the trade waste of the city as well. On Mr. Hering's basis, the capacity of the Drainage Canal would be adequate for 3,500,000 population. On the basis that the law calls for, it would be adequate for 4,400,000 population. If we exercise the police power later, and regulate these trade wastes, we may prolong the life somewhat for a longer period.

In 1886-7 we made a careful study of the ratio—an investigation which I have continued since at various times—of the growth of the population of Chicago. We took into account not only the growth of this city, but all other metropolitan cities of the United States and foreign countries, and we worked out the growth of Chicago on two branches, on two theories. One of these branches brought us 2,500,000 in 1905 and the other brought us 2,500,000 in 1915. That was 21 years ago. As a matter of fact, we will perhaps secure the 2,500,000 in 1910, half way between. The present population by the census estimate of last year was 2,500,000. The logic of that is that we are growing at the rate of a million in fifteen years, or 66,667 a year—about that rate. On Mr. Hering's basis of dilution in twenty years after 1910, on the basis fixed by law, we are going to reach the limitation of the channel in thirty years, assuming that the ratio keeps up.

That brings us to the other proposition, the question of a single channel. Chicago has provided for what you might call the Chicago River District. It has built a channel into the Chicago River District. It only needs $7,000,000 or $8,000,000 to be completed, to be properly connected with Lake Michigan. That brings up this much agitated Calumet question, about which there is a great difference in opinion. In 1886-7 the Drainage Water Supply Commission projected a channel there to carry 60,000 feet of water, 10 per cent of that which they intend for Chicago. In 1887 the Pure Water Commission proposed to change the course of the Illinois and Michigan Canal for that purpose. In 1888-9 I made a compilation for the Committee on Boundaries. I went into the distribution of population very carefully and also the assessed valuation around and about this city that was available for taxation purposes in carrying out a public work. At that time the assessed valuation of the Calumet region was between 3½ and 3¾ per cent of that of the area in the present district. I have the figures for the last seven years and it averages 3.71 per cent of the assessed valuation of the Calumet district, less than 4 per cent of that north of 85th street. The population runs a little higher. For nine years the Calumet region has grown exactly parallel with Chicago and no faster. We have a right to expect that that will continue in the future. That means, if anything, this: By the time Chicago has reached the capacity of the main channel, the Calumet region will not have reached 300,000 people. From an economic standpoint and from a sanitary standpoint, as I view the matter, that

makes the building of a canal from the Calumet region on any sanitary ground purely unjustifiable, as the sanitary aspect can be taken care of some other way. In my judgment, all the water must be provided at Chicago and the main channel completed. Assuming that to be so, we are up against some serious propositions. The Sanitary District had an expert committee in 1901 that made estimates upon various kinds of solutions, but no recommendations were made. The commission was disbanded before they had made a recommendation. In connection with the taking of the entire volume of water at Chicago, there were two propositions made as alternatives. One was to widen and deepen the Chicago river to the width of 360 feet up to somewhere in the vicinity of Van Buren street, and then 300 feet to the lake. I think the estimated cost was $22,000,000. As an alternative to that, a proposition was considered at something like $10,000,000 to carry the same character of river up to 16th street, and there produce an outlet at the cost of something like $5,000,000, that would furnish the additional water. In other words, of course, they demonstrated it was feasible to obtain the water at Chicago, and to obtain it in different ways, according to the amount of money you are willing to spend for it. As to exactly how to obtain that, opinions may still differ.

In relation to the question we are discussing, I would accept the river as it is today, made 200 feet wide, and as the Sanitary District has been working—or not working it out, I am sorry to say, for the last three or four years—and I would put an inlet across the south side on a possible extension of the Drainage Canal direct to Lake Michigan, somewhere between 22d and 16th streets, with the idea of a basin on the lake front possibly, and having done that, then estimate from that basis how much additional will be required to perfect it as a waterway and as a harbor.

The proposition as it looks to me, standing in the shoes not of Chicago, but in the shoes of the state and the United States in this matter, comes up to that as something like this: We have great difficulty in finding $20,000,000 for improvements from Chicago to St. Louis. Chicago is having no great difficulty in finding $80,000,000. It has found nearly $60,000,000, so we will utilize the works Chicago has produced, and if she builds it as a single channel we will co-operate with her and develop that channel as a harbor and waterway. If she does not provide an outlet to Lake Michigan, we don't know what we are to do. We certainly are not prepared to go in and build an entirely independent channel at very great cost, in view of the fact that this other can be made to serve the purpose, and the money could be better expended in producing the trunk before we produce the branches. I think that is the position you will find yourselves in in regard to it. If I owned Chicago as one man, and I think it is public policy to look at it in that light, then I would extend the Chicago Drainage Canal right across the south side on the tangent as it comes in from Summit, and I would make it an eighth of a mile wide and 30 feet deep. I think if Chicago had an estuary a quarter of a mile inland and you could not get across it in any way except by ferry boat, it would be the cheapest endowment the city ever had. I was never so forcibly struck with that proposition

as I was at one time in investigating terminal facilities at New York, where we cruised about the harbor in a West Shore tug. Although it is a serious embarrassment to people who have to cross by ferry boats and even to travelers that have to do so, that inconvenience is a slight matter considered in connection with the welfare of that city, which makes the reason for the city being there. So I say in regard to the development of the harbor here, the question of inconvenience of street cars and things of that kind is a secondary consideration. We should develop the situation on its logical lines to the best possible advantage and then make the best adaptations we can to the conditions which we have produced.

I want to refer briefly to the lake front proposition and to one or two matters, and then I will be through.

When I was consulting engineer for the State Board of Health prior to the passing of the law, we made a chemical investigation at many points between Chicago and St. Louis and at Cairo through the winter and summer, and some preliminary investigations for two or three other years. In the year prior to the opening of the Drainage Canal, our investigations were made also in places between Chicago and St. Louis, and after the opening of the channel they were repeated, and we found that the water from Chicago containing all of this sewage and running 100 miles, cannot be distinguished from ordinary river water, and long before the mouth is reached it has assumed normal conditions. At the mouth of the Illinois we found fewer bacteria than at the upper part of the Mississippi. In other words, this stream of water purifies, and is capable of taking on new increments of population.

The logical development for population and for industries that want to be by the water side and for commercial development is not along the lake front, but along this channel and down the state of Illinois.

I don't see how we can put the harbor on the lake front without complicating our sanitary problems. I don't see how we can construct industries along the lake front without increasing the sanitary cost in the future. However, there is another point in that connection. The polluted area of a harbor itself is very great. I don't know how much commercial development is expected along this lake front from a harbor. If it amounts to what it should amount to, with the growth of our country in the future, it will occupy a large section of this lake front and eventually will concentrate there a large proportion of the filth-producing industries. If we can produce this proposition inland I think it serves our purpose far better. I think it is far cheaper in the long run. The sanitary question is far easier. It lends itself better to the waterway question and you are contributing in a large way to a waterway possibility in which the state and nation is interested, and thus may enlist their co-operation, whereas on the lake front we have something that is of no use to anybody but to Chicago alone. Put a strip of greensward along the lake front and let residences spread out north and south, but don't concentrate your trade there or any industries that produce it or the commerce which produces it. I have no objection to certain development on the lake front for the coast trade, for this lake front trade. I think perhaps there is a proper place for limited use near the

mouth of your inlet, especially in the future, as I believe you will be compelled to do yet, and construct a basin around this inlet leading to this waterway, inclosing a couple of square miles. Every lake man is familiar with pollution. He has seen the river carry pollution into the lake. A basin will prevent that and hold it until the channel resumes its flow.

I have paid my compliments to the Calumet question; I will pay them to Evanston and North Shore. I would treat the North Shore condition as an economic proposition precisely in the same way. However, the channel that is being built is moderate in cost as compared to what the proposed channel at Calumet will cost and it furnishes an important and necessary circulation in the North branch which concerns one-third of our population, and that furnishes a justification which it would otherwise not have. When that channel shall be developed for harbor purposes, and you shall in the course of events have completed your sanitary solution and developed an inlet across the South Side for harbor purposes, it will be possible to fix your bridges in the heart of the city.

There are a good many details to this question which I don't think it is necessary to go into. I have given you an outline of my ideas in regard to the question. I believe we should proceed along the lines of completing the main channel to Lake Michigan and that we should contemplate as a part of that proposition the enlargement of it for harbor purposes and for waterway purposes.

## MR. ALFRED J. ROEWADE.

Those friends of Chicago's commerce, who so far have taken part in the public debate on the harbor problem, seem to labor under the misunderstanding that a harbor on the lake front is intended to replace the river harbors, or at least expose these to neglect in regard to proper improvements. Just because a modern harbor is proved impossible in the narrow river with its bridge obstructions, is it concluded that the building of a lake front harbor will put the rivers out of commission as essential parts of our future harbor. They evidently fail to comprehend the importance of the fact that two different kinds of harbor are needed in an industrial and commercial community as ours, and that the satisfaction of the commercial needs of up to date harbor facilities, in all probability will revive the interest in improvement of the harbor facilities for the industrial parts.

Almost the entire two-river harbor, as we find it to-day belongs to the industrial class; the commercial man being confined to the use of railways for shipping facilities. The need of improvement of the rivers is great indeed, yet as long as they are supposed to serve all sort of shipping needs, they will not arouse any earnest sentiment in their favor for no one can really believe they ever will be able to do that.

It is, therefore, absolutely necessary for us to distinguish between the two classes of harbor service we need.

The main characteristic of an industrial harbor is that it is spreading, as far out through the city's area as possible, thereby best serving the local supply system from yards and the local production at its scattered factories.

The main characteristics of a commercial harbor is that it concentrates the greatest possible amount of business on the smallest possible area. It is bound to do so in order to secure the most economical handling of the merchandise.

Any attempt at a reconciling of these diverging tendencies brings misery to the interests the harbor is serving, while efforts in the line of keeping them apart will clear the ideas in regard to the true purposes of a harbor, and as understanding begets interest, interest begets willingness to bring sacrifices in favor of improvements.

The old class of harbors, created to meet the demands of the sailing ship, and of which our present industrial harbors are a survival, are autocratic in thier nature. The navigation concerns had to own docks, warehouses and ships before business could be done; were very conservative, had to possess a great amount of self-reliance, were not easy to induce into new ventures and demanded big returns because risks were great, yet withal they had lots of time. The harbors of that time all had excessive dock lengths in which the ships seemed to vanish, and our industrial harbors have all retained these characteristics. Chicago, for example, has at least a mile of dock for each ship in the harbor, and a single concern, as the Deering Harvester Works, has 1½ mile of dock while 250 feet probably would facilitate its marine shipping and be idle most of the year at that.

The modern commercial harbor system, developed under the press of business and competition following the introduction of steam as motive power on land and water instead of horses and wind, is democratic in its nature. It removes the main risk from the shipper by furnishing a complete plant with facilities for trans-shipment, warehousing, overhauling and repacking of articles, and even office space for the shipper as long as his articles are subject to treatment. It makes no difference whether the shipper has a single case or sack of freight or a whole cargo, for the system, when in working order, works automatically and cannot stop to discriminate. The pronounced success of the modern German merchant marine, is the direct result of this harbor system. Any German, who in a foreign place sees an opportunity to turn an honest dollar in trade, has the system at his service; whether it is a new market for German industries, or a lucrative exchange of oriental articles. Hence an ever increasing network of small German trading stations is spreading over the globe and it will probably only be a matter of time before John Bull will be beaten in his own markets by this quietly working irrepressible chain of growing trade links, for he still adheres to the old autocratic shipping system.

Chicago, as located on an inland lake shore, may be thought independent of this international development, but she had better not be considered so. Competition with other shipping points and the opening of ship canals to the sea, for which we all work to our best ability, will change the inland character of her location. It would not be too early to realize the fact that the old harbor system with private piers and docks, gives the foreign shipper a means of eliminating his disadvantages as an alien concern, without giving similar advantages to us in return.

The building of the Basin Joliette on the Mediteranean shore of Marseilles, 1853, by a corporation of business men, might be the oldest commercial harbor made to suit the conditions of the steam age; but it was reserved for the citizens of the Hanseatic city Hamburg to establish the first logically designed commercial harbor basin, the Sandthorhafen, which was opened for the traffic 1866. It marks an epoch in merchant marine development which it would be folly not to recognize. With Prof. Richard T. Ely, I would say that, "True Americanism consists in finding the best in all lands and using it for American purposes, modifying it, transforming it to suit whatever is peculiar in our land."

Now if we keep before our mind this rational classification of harbors in two classes, an industrial and a commercial one; we will find it comparatively easy to settle the various questions involved in the Chicago harbor problem.

We should recommend that the industrial river harbors be improved, especially in regard to proper railroad connections and to the utilization of land on the river banks for manufactory purposes; that a connection canal be provided uniting the two divisions and that a number of public freight stations be established.

Then we must recommend that a commercial harbor with perfect complement of the highest grade facilities for hoisting, warehousing and trans-shipment, be built on the Lake Front as near as possible to the business district in order to prevent any split in the development of the city center or its real estate values. This harbor should, even if it is built or operated by a corporation, be under public control so that its true impartial commercial character can be maintained. The best plan for such a harbor is one in which the ship, after entering, finds herself in a navigation center, from which all lines of wharves and moorings are radiating; so that she can go to whichever place she wants to or move from one to another with the least possible trouble. A true commercial harbor serves as the hands or arms of a commercial community and is its central freight yard.

To place a simple addition to the present harbor on the Lake Front, without paying attention to the here argued classification, to locate individual or private yards or factories there, would be ridiculous, be creating a nuisance which would spoil plans which already have acquired popularity, but to locate a rational up to date public commercial harbor there, would add the greatest attraction to the Lake Front and its boulevards.

## OTHER SPEAKERS.

Other men who addressed the Commission were Messrs. Dwight H. Perkins, Homer J. Carr, Telford Burnham, Hoyt King, E. A. Halsey, J. A. L. Wadell, C. L. Dering, Victor Falkenau and A. J. Beirly. Valuable suggestions and information were also submitted in letters from traffic men, boat men and others. Among those who submitted their ideas by letter was Richard Price Morgan of Dwight, Illinois.

NAC 2560g27 Chi1909
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